the OIL AND GAS JOURNAL

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MAY 19, 1945

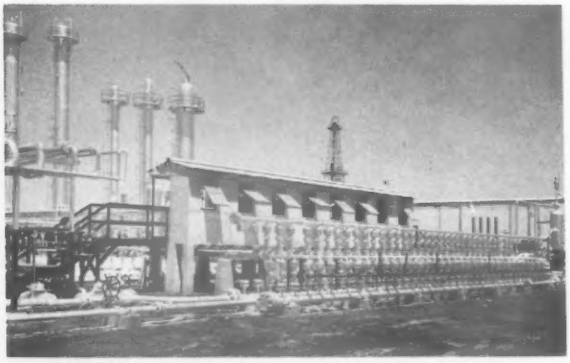
INFALLIBLE

Control in Cycling Plants

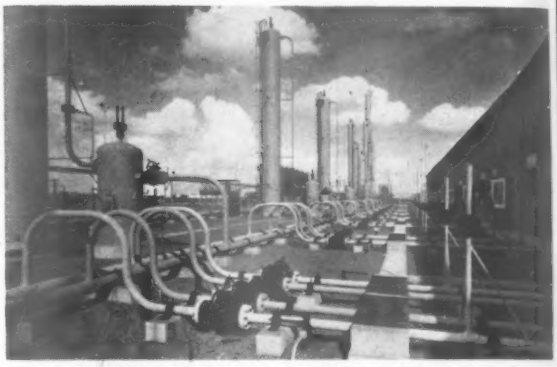
INSURED BY

NORDSTROM VALVES

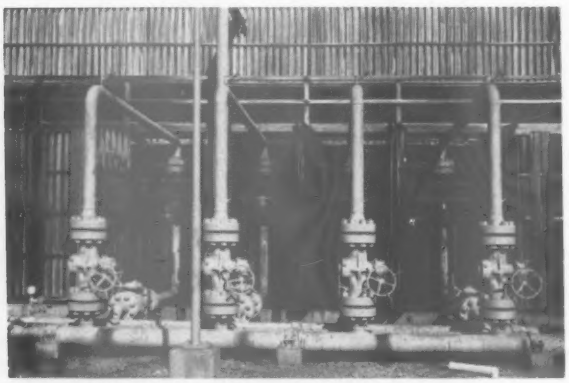
COTTON VALLEY Nordstrom Gear Operated Valves on high pressure lines in Cotton Valley, Louisiana, Cycling Plant.



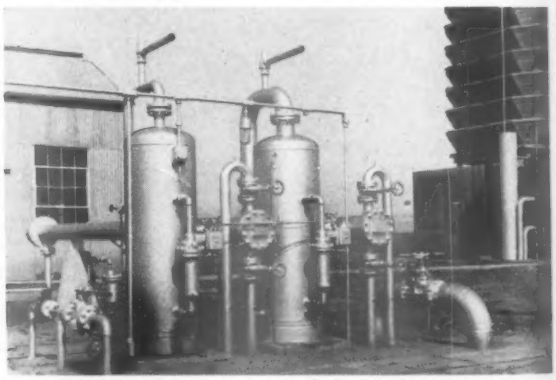
PALOMA Central station for gathering lines from wells, manifolded with Nordstroms, Paloma Cycling Plant, near Bakersfield, Calif.



LA GLORIA Nordstrom Valves on lines to compressors in La Gloria Condensate Recovery-Pressure Maintenance Plant at La Gloria, Texas.



ERATH Nordstrom Valves on high pressure gas cooling coils in Erath Cycling Plant, Erath, Louisiana.



NOVICE Nordstrom Valves operating inlet block line and discharge in States Oil Corp. Cycling Plant, Novice, Texas.

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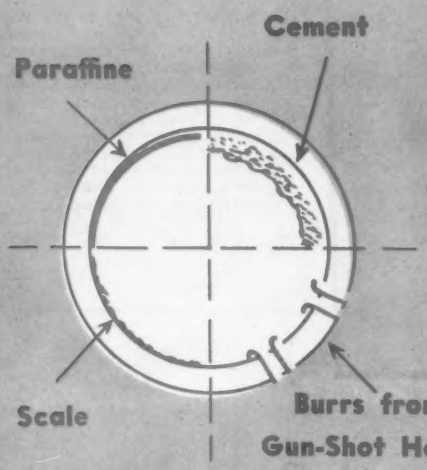

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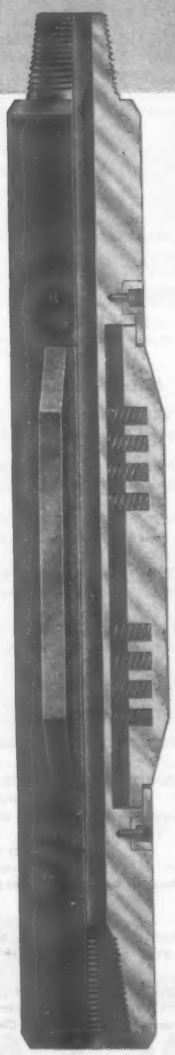


PRODUCT 620
Baker Rotary Casing Scraper

BAKER OIL TOOLS, INC.

Houston—LOS ANGELES—New York

the OIL AND GAS JOURNAL

Trends

Crude-Oil Production
By States—Page 168

CRUDE-OIL STOCKS 221,019,000 bbl. as of May 5—down 2,455,000 bbl. One year ago 234,166,000 bbl.

GASOLINE STOCKS 91,341,000 bbl. as of May 5—down 2,727,000 bbl. One year ago 88,186,000 bbl.

RESIDUAL FUEL-OIL STOCKS 39,503,000 bbl. as of May 5—down 310,000 bbl. One year ago 50,548,000 bbl.

GAS OIL AND DISTILLATE STOCKS 28,800,000 bbl. as of May 5—up 527,000 bbl. One year ago 30,356,000 bbl.

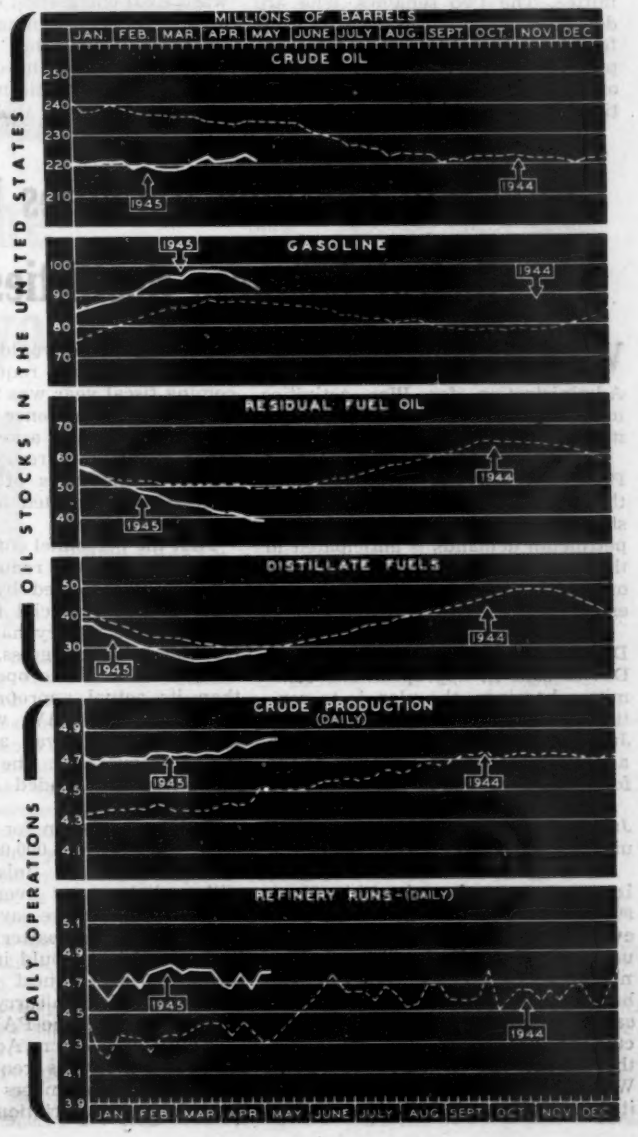
CRUDE OIL PRODUCTION 4,852,300 bbl. as of May 12—up 15,450 bbl. One year ago 4,511,600 bbl.

REFINERY RUNS 4,786,000 bbl. daily week ended May 5—up 6,000 bbl. One year ago 4,348,000 bbl.

ALTHOUGH the ending of the European war will not bring changes in volume and yield of products at most refineries in the United States and Canada, there are other plants in this and other countries whose processing methods have already been changed, with additional revisions assured as the military requirements of the Pacific war expand. The changes stem from two requirements—one an enlarged production of the supergrades of aviation gasoline and second, greater output of residual fuel oil and diesel oil.

IN regard to the aviation gasoline, no standard program can be set up as to the changes required in processing methods. What is done will depend on the overall manufacturing facilities of a refinery and the specific properties of the products to be manufactured. In general, the shift will mean a reduced production of those ingredients which have been termed the base products of aviation gasoline manufacture, with an increase in the output of the higher-octane components. In one operation which has been shifted to a 135-octane operation the amount of base stock from a catalytic-cracking operation has been substantially decreased, with an increase in the use of alkylate and pentane. This change, if maintained, will permit the operator to revise the catalytic operation so that throughput of charging stock can be increased. The octane rating of the cracked gasoline from this operation will decrease, but it will be suitable for use in civilian-grade gasolines. In another operation it will be necessary to expand the use of the catalysts, with other changes in operating controls, in order to increase the octane rating of the finished product.

MOST of the increased production of heavy fuel oils will come from foreign plants. It is pointed out, for example, that the refineries on Aruba and Curacao islands—two of the largest plants of the petroleum industry—can expand their output of residual fuel oil through changes in plant processing and greater use of low-gravity crude oils from the neighboring fields in the Lake Maracaibo area of Venezuela. Another source of additional supplies with the increased shipping facilities will come from the Persian Gulf area. In the past a part of the fuel-oil output of the large Abadan refinery in Iran, due to a lack of available outlets, has been returned to formations.



Revised Oil Treaty Satisfactory To Industry and Government

WASHINGTON.—A new draft of the Anglo-American petroleum treaty has now been completed and apparently is satisfactory to all branches of the oil industry and to all departments of the government.

The draft was discussed in San Francisco last week by Ralph K. Davies, deputy petroleum Administrator, and William R. Boyd, Jr., chairman of the Petroleum Industry War Council, who flew there to confer with Sen. Tom Connally, chairman, and Sen. Arthur H. Vandenberg, influential Republican member, of the foreign relations committee. The two senators, who are delegates to the World Security Conference, are understood to have approved the new draft. In the light of this it is probable that negotiations with the British Government will be reopened in the near future.

While details of the new draft have not been made public, it is believed that all controversial questions have been solved, and that while both the State and Justice Departments object to a clause in the treaty giving the industry antitrust immunity in following recommendations of the proposed international petroleum commission this question probably can be settled by separate legislation.

The San Francisco conference was described by Davies as representing "One more step along the road toward final completion of the present draft." While declining to comment in detail upon the conversations with the senators, he declared himself "more optimistic now as to the ultimate success of the project."

PAW Will Continue Activities Until End of Japanese Hostilities

WASHINGTON.—There will be no severe curtailment in Petroleum Administration for War activities immediately after victory in Europe, it was learned here this week.

Both the Washington and district PAW offices will be continued until the Japanese war is finished, the staff is being told. No reduction in petroleum demands is anticipated in the next few months, and the work of PAW will continue to be necessary.

From a long-range point of view, Deputy Administrator Ralph K. Davies said in appropriations committee hearings, the plan is to continue operations until the end of the Japanese war but to reduce the agency's activities as fast as is feasible.

After the end of the war with Japan, Davies said, PAW can be liquidated in 90 days.

Some small details of the organization may be pruned within 60 or 90 days after V-E Day. This, however, will be more the result of natural reduction of operations than a necessity forced by the $435,000 budget reduction for the 1945-46 fiscal year announced last week. Such cuts as are made will be made throughout the organization, both Washington and in the field, and it is now expected that no more than 100 persons would be dropped.

PAW's original request for the coming fiscal year was $4,435,000. In view of the imminence of V-E Day, President Truman asked PAW and other agencies to revise their estimates to the basis of a one-front war. PAW submitted a revised request of $4,000,000.

That the personnel cut may be less than the $435,000 reduction would demand is indicated by PAW's almost unique financial history. Not only has the agency had no budget troubles with Congress, but it has always been able to operate on less than its actual appropriation. The high year for PAW was 1943-44, when $6,070,000 was appropriated, including overtime. The year ended with an unexpended balance of $215,000.

The appropriation for the current fiscal year was $6,000,000, and the agency expects to finish the year with a balance of over $1,000,000. While none of these savings can be carried over, the pattern of operation established would indicate that the $4,000,000 request for 1945-46 will be sufficient to carry out all the main features of the PAW program.

Deputy Petroleum Administrator Ralph K. Davies has frequently been commended by members of the Congressional appropriations committees, and only once has his request been cut on Capitol Hill. This was for the current fiscal year, when $70,000 was sliced off the PAW estimate.

Bradford Reserves Judged At 80-90 Million Barrels

OIL CITY.—The Bradford oil field, a major source of Pennsylvania Grade crude, still contains 80 to 90 million barrels of recoverable petroleum, J. P. Jones, director of production, reported to the Pennsylvania Grade Crude Oil Association's board of directors.

Production in the Bradford field last year topped 12 million barrels. Jones based his reserves estimate on a study made in conjunction with preparation of a new field map of the Bradford pool. There are 14,300 undeveloped acres within the pool limits, he said, and recoverable oil is estimated at 4,000 bbl. to the acre. The balance of the reserves underlies developed acreage.

All phases of the association's new $300,000 production research program have been launched following recent expansion of the research staff, Dr. R. V. Hughes, director of production research, reported.

The association's annual meeting, usually held in June, will be deferred until the burden on travel facilities is eased, the board decided, in cooperation with ODT requests.

New Spacing Patterns in District Two Announced

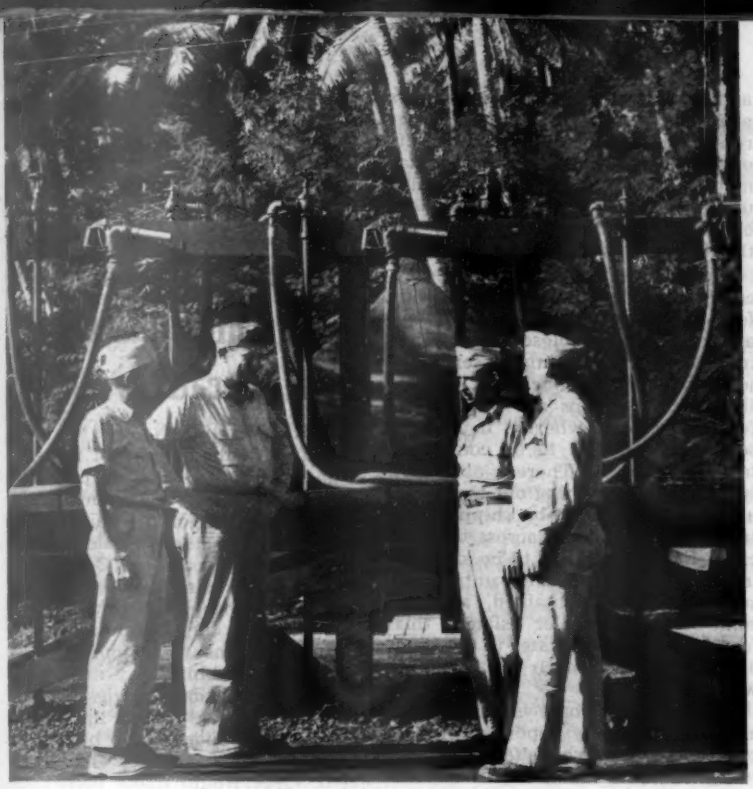
CHICAGO.—Specified optional spacing patterns for oil wells in the Haferman, Doran, and Doran West fields of Rice County, Kansas, providing for locations within 30 ft. of the center of either the northwest quarter, or the southeast quarter of a quarter-quarter section, were announced by the Petroleum Administration for War, effective May 1.

In the Dwight field, Dwight Township, Huron County, Michigan, effective May 5, the spacing pattern was established as within 30 ft. of the center of the south half of a quarter-quarter section.

Air-Gas Corrosion Study Launched in Pennsylvania

OIL CITY.—The Batelle Memorial Institute of Columbus, Ohio, has undertaken a study of the causes of corrosion in air-gas secondary recovery oil-producing operations in the Pennsylvania Grade region to find preventive measures.

The institute, which is conducting similar studies on corrosion problems in gas distillate producing wells in Louisiana and Texas, started the Pennsylvania Grade project May 1.



One of the "filling stations on the road to Tokyo." Former oil-industry men now in the fuel office of the Navy supply depot, Guam, at a diesel tank truck loading rack: Lt. J. Dimeling, Jr., assistant fuel officer, in charge of harbor fueling, formerly superintendent of Walsh-Driscoll Construction Co., Spokane; Lt. Com. Sidney Goldin, of Atlanta, fuel officer, formerly assistant manager of the New York division, Shell Oil Co., Inc.; Lt. Com. W. W. Craig, of Hamilton, Tex., in charge of the petroleum testing laboratory, formerly chief engineer, refining and technology division, Gulf Oil Co., and Lt. L. Lowrey, Corpus Christi, assistant fuel officer, in charge of logistics and safety, formerly petroleum inspector, E. W. Saybolt and Co.

Oil Greases the Road to Tokyo

by Henry D. Ralph

IN THE MARIANAS.—The road to Tokyo is a series of filling stations, manned and supplied by the American oil industry.

The most striking impression of a visit to the forward areas in the Pacific is the way every operation—every minor activity—depends on a steady supply of petroleum power. The marvel is how sufficient oil is always on hand in these tiny but terrifically busy islands thousands of miles from the nearest refinery.

The marvel is explained, partially, when it is discovered that the Navy, which is responsible for the supply of oil to all the services in the Pacific area, has virtually turned the job over to the oil industry. At every base and in every harbor there is a fuel office manned by officers and enlisted men drawn directly from the oil industry. These men are fueling the Pacific war with the methods and the experience of the oil industry, and their success is shown by the way our fighting forces have hopped across the Pacific to Japan's front door.

But no oil man in industry ever had to walk such tight ropes of supply and demand as these oil men who wear the Navy gray and khaki.

This is the first of several dispatches which War Correspondent Ralph, the Journal's Washington editor, will write from his notes and observations collected while on an extended trip to Navy fueling and operating bases in the Pacific military theater. Background information for analytical and interpretative discussions of the oil industry's assignment in concluding phases of the war were gathered from Navy personnel at the important supply centers. Ralph was one of a selected group of business paper editors selected by the Navy Department to make a personal inspection of the staggering logistic problems involved in applying the full power of Allied military forces against Japan. As guests of the Navy aboard a military transport plane, Ralph and his contemporaries flew to Pearl Harbor, to intermediate supply bases and ended the outward journey in the Marianas, within 1,500 miles of Tokyo.

Oil can enter the Pacific at only two places — California or the Panama Canal—and the number of tankers out here is barely sufficient to maintain the movement of the required supplies if all are used to maximum efficiency. But there were no places in the Pacific to unload tankers, and no tank farms in which to store and distribute the oil. And to make the problem more difficult, the fuel requirements of the fleet at sea, of the air forces, and of the many invasion operations are likely to fluctuate tremendously without advance notice.

In spite of these difficulties, the Navy oil men have met every demand for fuel. No scheduled operation has had to be called off, no fighting ship has been detained in port, for lack of fuel. There are times when inventories get down to zero and a fleet of ships must sail in a few hours, but always a tanker arrives in time as scheduled. At other times the fleet and the air forces have had to be rationed a bit, but not to the extent of postponing scheduled operations or hampering important activities.

The story of how oil is supplied to the forward bases, to the fleet at sea, and to invasion forces will be told in later articles in such detail as security will permit. But first some general impressions of an oil writer on a quick look-around at a number of our far Pacific bases.

The tremendous amount of construction work and industrial activity going on everywhere is breath taking. Islands captured from the Japs only a few months ago are already so covered with roads, buildings, airports, and other installations that from the air they look like large cities. Cities is what they are, with docks, machine shops, garages, warehouses, refrigerator plants, water systems, electricity, telephones, restaurants, housing. Everything had to be brought there on ships, and ships also must keep bringing in the gasoline and diesel oil to run the thousands and thousands of engines re-

quired to operate the water, electric, and transportation systems.

Construction work goes on night and day, and it is never finished. Mountains and valleys are leveled to make airstrips and sites for barracks, offices, and shops. Machinery and equipment for repairing and servicing ships, airplanes and land vehicles are put in operation in tents or in the open until buildings can be built. Each island is a busy port, a humming industrial center, and a major construction project all at once, and traffic on the new highways is always jammed.

Only then is it realized that each island was taken for a specific purpose—not to drive out the Japs but to use the place as a base, airport, or staging area for a future operation. Months before we moved into any one of these places, such as Kwajelein, Guam, Saipan, or Iwo Jima, we had planned out in detail exactly what installations were to be put there and on what parts of the island. All the equipment, and the required amounts and types of fuel and lubricants, were assembled in advance, and the crews that went with the equipment knew exactly what they were to do and why.

Forward Bases Essential

Tiny Iwo Jima is a good example. Of course it was a blow to Jap prestige to have us take this strongly fortified bastion so close to Tokyo, but that was incidental. The real reason for its capture was to give us an advanced base to facilitate future operations in Japan's air and waters.

This correspondent visited Iwo on D plus 68—little more than 2 months after the first Marines touched the beach. Already the island was circled and crisscrossed with roads. Bulldozers were leveling the fantastic canyons and rock formations, and incidentally uncovering many live Japs in the hundreds of caves which honeycomb the place. While bulldozers were still at work on two of the air strips the big B-29's were landing there on their way back from Tokyo in need of emergency repairs or too short of gasoline to get back to their bases in the Marianas. From other incompleted fields fighter planes were taking off to provide cover from the Marianas-based B-29's, or to attack Jap cities and shipping themselves. Repair shops were already operating, radio stations were in use, ships were unloading, supplies were being stacked up ashore, and construction work was in progress everywhere. Before long every square foot of the little island will be occupied by a military installation—all planned in advance to fill a specific place in coming operations.

Another outstanding impression is the complete assurance of victory and utter contempt of the enemy's ability to interfere with our progress. There are plenty of Japs left on bypassed islands—and for that matter on some of the islands we are using—but they have been so thoroughly immunized that we pay little attention to them.

Fighting ships and planes are coming and going constantly, but few large concentrations of troops are seen even this close to the fighting front. It is mainly a servicing job out here; so much so, in fact, that combat troops are being used for service jobs, whereas in Europe service troops had to be converted to combat troops. There is absolutely nothing of anything out here, and all supplies have to be shipped the tremendous distances across the Pacific. Even water has to be shipped in to some of the islands until local supplies can be obtained, and on some of the smaller islands this means distilling seawater to the tune of 1 gal. of oil for each 7 or 8 bbl. of water produced.

Every forward base is an airport, a harbor, a supply depot, and a repair shop. The shop facilities already in operation for repair of aircraft and ships are astounding. Acres and acres of machine shops of every conceivable type, all full of the most modern brand-new equipment, keep the fleet operating in Jap waters without the need to return thousands of miles to home ports.

Huge segments of America's industrial might have been transplanted to pin points of sand and former jungles thousands of miles across open waters. No visitor can help but share with the men at work out here the confidence of steady progress into the heart of the Jap empire. All that is needed is a continued steady flow of materials and supplies of all kinds, and the petroleum products on which every activity depends.

Stripper Reserves Are 8.16 Per Cent of Total

WASHINGTON.—Proved crude reserves underlying stripper well fields in the United States total 1,769,000,000 bbl., the Petroleum Administration for War has informed the Office of Price Administration.

OPA asked PAW to make a survey of the probable reserves of wells eligible for its stripper well premium price plans. The PAW estimate was based on a continuation of the current methods of production prevailing in the various fields, including secondary-recovery methods by air, gas, and water drive.

These reserves represent 8.16 per cent of the total proved crude-oil reserves of the United States and are concentrated largely in five states as follows: Oklahoma, 446,000,000 bbl.; Texas, 406,000,000; Kansas, 138,000,000; Pennsylvania, 123,000,000, and California, 95,000,000 bbl.

Ration Change to Await Third Quarter PAW Allocations

WASHINGTON.—No determination of the amount of increase in gasoline rations will be made by the Office of Price Administration until allocations for the third quarter are set by the Petroleum Administration for War, Chester Bowles, OPA administrator, told a press conference last week.

To increase the present value of A card coupons from four to five gallons, 45,000 bbl. a day more gasoline will be needed, Bowles pointed out. To step the ration up to six gallons per coupon, 80,000 bbl. daily would be necessary. In the latter event, OPA would make each coupon worth 5 gal., but shorten the period each allotment must serve to arrive at the 6 gal. value.

Attempts will be made to up the B card quota for occupational users, particularly salesmen, Bowles said. To equalize the national B card value to a maximum of 625 miles a month an additional 30,000 bbl. per day would be needed.

Jap Oil Centers Subjected To Crushing Air Attack

The first heavy aerial attack on Japanese fuel-oil storage and manufacturing centers was loosed May 10 by more than 400 huge Superforts with the destructive capacity of 1,000 Liberators. The record-breaking assault left smoke columns billowing more than 15,000 ft. above ruins of fuel tanks and plants at Tokuyama and Otake, on southwestern Honshu Island, main unit of the Nipponese homeland chain.

Flying through flak fields but meeting little fighter opposition, the B-29s also hit airfields on Shikoku and Kyushu islands, and Japan's biggest homeland oil-storage center on Oshima Island, off the northwest tip of Kyushu.

All the targets were in the western areas around the Japan Inland Sea, requiring a round-trip flight of more than 3,000 miles for the Superforts.

The raid was the first in the hurricane of bombing promised Japan at the end of the German war. The blow at Tokuyama took in the naval fueling station and a neighboring synthetic-fuel factory.

THIS WEEK

WAR— Oil from Tarakan, invaded by Australians, may be used in final drive against Japan. . . . Find 300 tons paraffin. . . . Using it in repairing air fields. . . . ¶Martin J. Gavin back from China with report for PAW on petroleum conditions. . . . Nothing public yet, owing to security regulations. . . . ¶Military requirements in Pacific for distillates, fuel oil promise to exceed those for two-front war. . . .

POSTWAR—Crudes with high percentage straightrun gasoline and lubricants to have call with recession of military demand. . . . Refiners' first step will be raising quality of gasoline to prewar levels. . . . Superfuels will depend on type engines available. . . . ¶Texas Railroad Commission urges on PAW gradual reduction in output from state's overworked oil fields as soon as war conditions permit. . . .

RESTRICTIONS— Controls on installation of gasoline pumps, storage tanks, other improvements eased by PAW. . . . ¶OPA modifies ban on use of fuel oil on highways. . . . ¶Restrictions on liquefied gas must continue till Japan is defeated. . . . ¶No early softening of restrictions on gasoline and fuel oil. . . . ¶PAW denies "hoarding" gasoline in East. . . .

PRODUCTION—Third pay established in TXL pool, West Texas, indicating major oil-field rating. . . . Latest two tests get promising Ellenburger production. . . . First pay found was Devonian. . . . ¶Nation's crude output pursues weekly habit of recording new peak, 4,852,300 bbl. . . . Up 15,400. . . . Kansas chief contributor. . . . Texas down. . . . Strain on Texas wells to produce oils for war use reflected in sharp decline in number of flowing wells and marked increase in pumpers. . . . Curtailment of new completions during war years partly responsible. . . .

MATERIALS— Year's supply of high-temperature powder released by Army Ordnance for gun-perforating casing assures faster, less hazardous deep-well completions. . . . ¶Nylon-plastic insulated wire made available for gun-perforating operations gives satisfactory service in high temperatures, high pressures. . . .

NATURAL GAS— Former Gov. Sam Jones says Louisiana's known reserves face depletion in 25 years, yet she's shipping 50 per cent of withdrawals to areas blessed with 3,000 years' supply of coal. . . . ¶Campaign to pass conservation bill at current session of Texas Legislature apparently abandoned. . . . Had been urged as "must." . . . ¶FPC refuses to authorize natural-gas line from Reynosa field, Texas, to Monterrey, Mexico. . . . "No necessity" and "might cause shortage in Southwest." . . . ¶A.G.A. maps 3-year $2,000,000 research program production and utilization of natural gas. . .

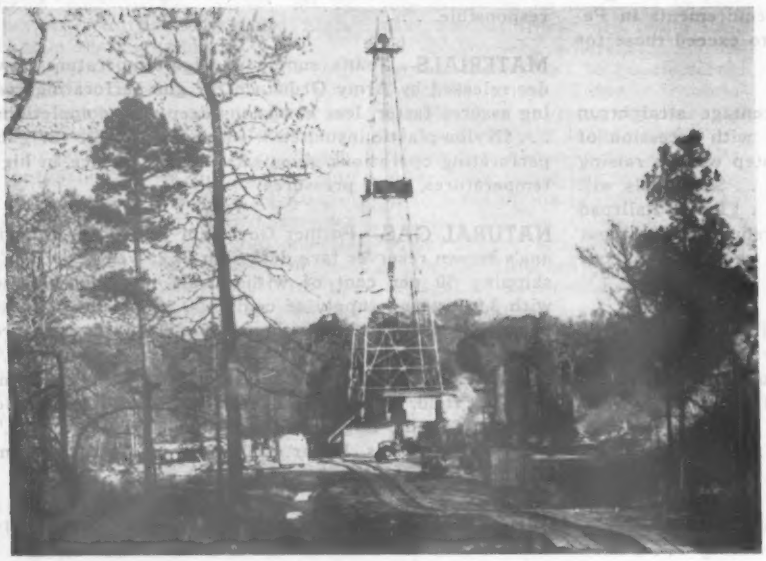
DRILLING— Sharp drop in drilling in Southwest threatens PAW goal of 7,200 wells for third quarter. . . . ¶Country's weekly record for completions in 1945 hits new high with 546. . . . Previous high 529, week ended April 14. . . .

Acme

Service forces which went ashore with combat troops when Australians invaded Tarakan Island, Borneo, will have such installations as this to restore. Supplies have already been delivered to some of the forward bases for that task

Carthage Area Holds Promise of Becoming World's Largest Gas Reserve

by Neil Williams



Typical steam drilling operation in Carthage field. Much of the area, located in the Sabine River bottoms, is thickly wooded with pines and scrub oak. (Photographs by J. E. Hampson through courtesy of Arkansas Natural Gas Corp., Shreveport)

GAS reserves which may rival individually those of the Hugoton district of northwestern Oklahoma and southwestern Kansas, the Panhandle of Texas, and the now nearly depleted Monroe field, northeastern Louisiana, rapidly are being proved in the Carthage area of Panola County, eastern Texas. Carthage, as yet undefined in areal extent, could become the largest gas-producing reserve in the country without substantial change in present concepts of its size.

Extending about 20 miles from the most northeasterly to southwesterly, and about 15 miles from the most northwesterly to southeasterly outpost wells, the present producing area at Carthage embraces upwards of 300 square miles, or approximately 192,000 acres. Some students of the field's development and its structural and formational characteristics estimate that the prospective productive area may cover as much as 307,000 acres. For conservatism, however, they generally reduce this figure to within 250,000 acres.

Some indications of the probable gas and recoverable liquid reserves of the four known producing horizons in the field are given in Table 1. These place the total gas volume in place at slightly over 4¼ trillion cubic feet. Ultimate recovery, considering reservoir efficiency, will run from about 2½ to 3 trillion cubic feet, it is estimated. Certain reliable engineers and geologists have predicted reserves at various figures ranging up to 11 trillion cubic feet, although such figures are beyond the conception of most operators. Based on average recovery rates so far and on indicated gas reserves (Table 1) recoverable liquid (condensate) will approximate 39½ million barrels.

It is significant that this reserve is accessibly located in respect to various large gas transmission systems serving and leading out of Texas and Louisiana to major fuel markets in the southeastern, central and eastern states. United Gas Pipe Line Co. has a 22-in. trunk line passing through the heart of the field. Arkansas Louisiana Gas Co.'s North Louisiana system required the laying of only 18 miles of 12-in. line to connect the field with its Bethany (Texas) station, former southwestern terminus. Southern Natural Gas Co.'s North Louisiana system with a trunk line eastward across Mississippi and Alabama, extends to Logansport, La., within 30 miles of the field, and to which it is proposed to lay an additional 14-in. extension, and a loop from Logansport east to Monroe. Lone Star Gas Co.'s North Texas system extends to Athens, Tex., less than 75 miles west of the field. Tennessee Gas & Transmission Co. new 24-in. trunk line from South Texas to the Appalachian region passes within 60 miles south of the field and through Monroe, only 140 miles east. United Gas Pipe Line Co. has announced plans for a 24-in. line from the field to its Sterlington station at Monroe where it will connect with Tennessee Gas & Transmission. All companies operating these systems directly, or through subsidiary or associated companies, have substantial interests in the field.

Development of Carthage is particularly timely in that the Monroe field, which in the years past has been a primary source of supply for several of the pipe-line systems, is facing early exhaustion. Monroe production for some time has been inadequate to meet the demands im-

TABLE 1—ESTIMATED GAS AND CONDENSATE RESERVES

Zone—	Depth Range (ft.)	Est. Prod. Area (acres)	Avg. Net Porosity Thickness (ft.)	Gross Reservoir Vol. (ac.-ft.)	Gas Volume* (cu.ft./ac.ft.)	Gas Vol. Proved Area (mil.cu.ft.)	Est. Reservoir Efficiency (%)	Est. Tot. Gas Recovery (mil.cu.ft.)	Avg. Liquid Recovery (bbl./mil.)	Est. Ultimate Liq. Recovery (bbl.)
Hill	4,900-5,050	18,000	6	108,000	1,075,000	116,100	70	81,270	15	1,219,050
Upper Pettit	5,650-6,000	120,000	20	2,400,000	860,000	2,064,000	60	1,238,400	14	17,337,600
Lower Pettit	5,850-6,200	120,000	14	1,680,000	875,000	1,470,000	50	735,000	18	13,230,000
Travis Peak	6,000-6,400	50,000	18	900,000	650,000	585,000	60	351,000	22	7,722,000
						4,235,100		2,405,670		39,508,650

*Calculated with consideration to porosity per cent, connate water content, net effective porosity and other related factors.

TABLE 2—GAS PRODUCTION BY ZONE
(Production in Thousands of Cubic Feet)

Year—	Zones: Hill	Upper Pettit	Lower Pettit	Travis Peak	Total
1937	.....	907,326	212,123	.....	1,119,449
1938	.....	420,651	320,410	.....	741,061
1939	.....	363,336	318,427	.....	681,763
1940	269,437	1,153,318	757,756	.....	2,180,513
1941	1,582,699	1,256,610	1,270,758	.....	4,210,067
1942	3,952,375	1,084,571	1,161,590	.....	6,198,536
1943	7,531,466	2,109,544	1,360,951	267,546	11,269,507
1944	10,489,344	7,194,241	3,609,320	409,323	21,702,228
1945*	2,343,361	2,659,895	857,728	86,035	5,947,019
Total	26,268,682	17,149,492	9,869,065	762,904	54,050,143

*Two months—January and February.

TABLE 3—CONDENSATE PRODUCTION BY ZONES
(Production in Barrels)

Year—	Zones: Hill	Upper Pettit	Lower Pettit	Travis Peak	Total
1937	.....	12,200	3,549	.....	15,749
1938	.....	6,735	6,499	.....	13,234
1939	.....	6,091	7,152	.....	13,243
1940	5,418	17,127	14,731	.....	37,276
1941	27,860	20,607	22,486	.....	70,953
1942	65,920	16,552	22,857	.....	105,329
1943	114,679	33,247	27,324	6,455	181,705
1944	145,659	97,148	61,588	8,533	312,928
1945*	34,271	36,429	12,309	1,431	84,440
Total	393,807	246,136	178,495	16,419	834,857

*Two months—January and February.

TABLE 4—ALLOWABLE GAS PRODUCTION FOR APRIL

Zone—	No. wells prod.*	Daily potential (cu. ft.)	Monthly production (cu. ft.)	Dly av. prod. (cu. ft.)	Condensate recovery† (bbl.)
Hill	11	842,000,000	1,601,305,000	53,376,833	900
Upper Pettit	16	915,000,000	1,360,037,000	45,334,567	840
Lower Pettit	15	726,262,000	859,491,000	28,649,700	430
Travis Peak	1	11,000,000	82,500,000	2,750,000	45
Total	43	2,494,262,000	3,903,333,000	130,111,100	1,915

*Two-zone wells listed in both horizons. Shut-in wells not included. †Estimated.

TABLE 5—AVERAGE CONDENSATE-GAS PRODUCTION BY ZONES†
(Barrels per million cubic feet)

Year—	Zones: Hill	Upper Pettit	Lower Pettit	Travis Peak	Average
1937	..	14	17	..	15
1938	..	16	20	..	18
1939	..	17	22	..	19
1940	20	15	19	..	17
1941	17	16	18	..	17
1942	17	15	19	..	17
1943	15	16	20	24	16
1944	14	14	18	21	15
1945*	15	14	15	17	15
Weighted average	15	14	18	22	16

*Two months—January and February. †Based on condensate and gas production by zones (Tables 2 and 3).

posed upon it. While the systems drawing on Monroe are served by various other North Louisiana, Arkansas and northeastern Texas fields, the reserves in these other pools also are being greatly diminished, and the operating companies have been faced with the necessity of looking for new sources of supply.

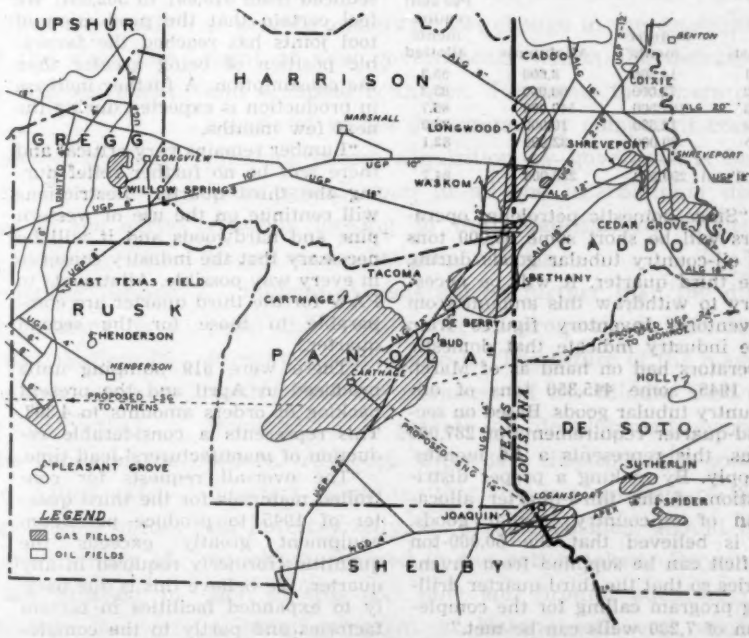
Field Development

Although the field was opened in 1936, principal development and extensions of the producing area to sizable proportions have been largely within the past year. In the period from the discovery of the field through 1943, only 18 wells were drilled. However, as seven wells were completed in two zones, they represented the equivalent of 25 wells. More than half of the 18 wells were drilled in 1943. Also the first dual completion was not made until late in 1942. There now are 54 wells, of which 33 have been completed in two zones, making a total of 87 wells (counting two-zone completions as two wells).

The retarded development during the years prior to 1943 was due mainly to the lack of demand for gas. First wells were drilled solely in exploration for oil, and when they found only gas, for which there was no demand at the time, development was virtually suspended. In fact after the drilling of the first two wells, located about 3 miles apart, and one offset each, all completed late in 1936 and early 1937, there was no further development until the middle of 1939, during which year one additional well was drilled. Also, during 1940 only one well was drilled while two more were completed in 1941. With the higher value and importance now attached to gas, the increased demand and prospects for greater utilization of this product, and the need for developing additional reserves which have come with the war, there has been incentive for more intensive development of the area.

At latest count, there were 22 drilling rigs running in the Carthage area. This is in contrast to the three rigs which were operating at the beginning of 1944. Operators represented in the latest count and the number of rigs running for each are: Skelly Oil Co., six; Union Producing Co., Arkansas Louisiana Gas Co., Lacey & Lillard and Southern Producing Co., two each; Continental Oil Co., Glassell & Glassell, Humble Oil & Refining Co., Chicago Corp., Sun Oil Co., A. D. Roberts, McAlester Fuel Oil Co., and W. H. Mitchell, one each. More than 15 additional

(Continued on page 109)



Map of portion of eastern Texas and western Louisiana showing the location of Carthage field, and present and proposed gas-line outlets. (Base adapted from map prepared by Alec M. Crowell)

Materials Outlook Brightens as Anticipated Crisis Is Averted

WASHINGTON.—A somewhat brighter outlook for materials for the petroleum industry was reported to the production committee of Petroleum Industry War Council this week by Claude P. Parsons, director of materials, and John R. McWilliams, director of production, of Petroleum Administration for War.

An anticipated crisis in oil-country tubular goods apparently has been averted, although this item will remain tight. According to McWilliams:

"Representations have been made to War Production Board to obtain a total of 340,500 tons of carbon and 57,200 tons of alloy steel for third-quarter domestic production operations and MRO requirements.

"Oil-country tubular goods (casing, tubing, and drill pipe) requirements included in these total steel figures are 299,500 tons. It has been determined by the steel division of WPB that the mill capacity remaining for the combined PAW's domestic and foreign programs during the third quarter will only be 278,000 tons. A minimum space directive has been placed on the mills by WPB in order to assure the petroleum operators of obtaining this amount. Allotments of oil-country tubular goods made to the individual districts are as follows:

Dist.	Requirements	Allotments	Per cent requirements allotted
1	14,500	8,000	55.2
2	72,000	60,000	83.3
3	161,500	140,000	86.7
4	12,500	10,000	80.0
5	39,000	32,000	82.1
Total	299,500	250,000	84.7

"Since domestic petroleum operators will be short some 50,000 tons of oil-country tubular goods during the third quarter, it will be necessary to withdraw this amount from inventory. Inventory figures from the industry indicate that domestic operators had on hand as of March 1, 1945, some 445,350 tons of oil-country tubular goods. Based on second-quarter requirements of 287,000 tons, this represents a 4.6 months' supply. By making a proper distribution of the third-quarter allocation of oil-country tubular goods, it is believed that the 50,000-ton deficit can be supplied from inventories so that the third-quarter drilling program calling for the completion of 7,200 wells can be met."

Parsons explained that total estimated requirements of tubular goods for foreign and domestic drilling programs for the third quarter added up to 338,000 tons, whereas the total productive capacity of both seamless and electric-weld mills is only 300,000 tons per quarter. In addition, only 248,000 tons of mill capacity was allotted to the oil industry, the rest being held for bombs. As a result of a survey of the industry, PAW concluded that 50,000 tons of tubular goods could be taken out of inventory provided an additional 30,000 tons of mill space was surrendered by the military. This finally was agreed to because of the importance of maintaining oil production, and as a result Parsons predicted there will be an adequate supply of tubular goods for both foreign and domestic drilling programs the third quarter. He added that this is the first time a space directive has ever been issued to the mills for tubular goods, the largest-tonnage item used by the oil industry.

Parsons Summarizes Conditions

Parsons, who is returning to the industry in a few weeks, added these comments to the materials situation:

"There was a production of 41,023 tool joints during the month of April and the backlog of orders was reduced from 513,691 to 502,657. We feel certain that the production of tool joints has reached the favorable position of being greater than the consumption. A further increase in production is expected during the next few months.

"Lumber remains very critical and there will be no further relief during the third quarter. Restrictions will continue on the use of western pine and hardwoods and it will be necessary that the industry conserve in every way possible. Allotments to PAW for the third quarter are comparable to those for the second quarter.

"There were 819 pumping units produced in April and the present backlog of orders amounts to 4,367. This represents a considerable reduction of manufacturers' lead time.

"The over-all requests for controlled materials for the third quarter of 1945 to produce petroleum equipment greatly exceeds the quantities formerly required in any quarter. We believe this is due partly to expanded facilities in certain factories and partly to the completion of war contracts which relieves manufacturing facilities in the plants."

Discussing projected changes in control on materials, McWilliams said:

"Due to recent successes in military operations, numerous relaxations and revisions of the controls on materials are being made or are being contemplated by WPB. PAW will revise its orders controlling the delivery and use of materials in conformance with the changes made by WPB. Until such time as materials are readily available in quantities sufficient to carry out all production operations contemplated by petroleum operators, the production division proposes that a preference rating shall be assigned petroleum operators for use in acquiring materials. In order to provide this priorities assistance, it will be necessary to assure that the materials are being used efficiently. Furthermore, the probability that requirements for petroleum will remain at or near present high levels throughout the Japanese war also makes it important that the maximum return of oil be obtained from the steel expended as long as there is any shortage of such materials. PAO 11 will continue to serve these purposes. However, the spacing provisions of the order will continue to be relaxed at such times and to the extent that the increased availability of materials permit."

McWilliams reported that during the first quarter of 1945 a total of 5,302 wells was completed, which was only 88.4 per cent of the 6,000 programed. Districts 1, 2, and 3 fell considerably below their quotas, while District 5 was the only one exceeding the program, completing 562 wells against a projected 500.

"A total of 303 wildcat and new pool tests was completed during March, of which 61 were successful and 242 were dry. Two hundred and seventy-nine of the tests were wildcats, of which 48, or 17 per cent, were successful, and 24 of the tests were new-pool tests of which 13, or 54 per cent, were successful."

Oil Workers Vote on New Contract With Sinclair

Eight thousand members of Oil Workers International Union (C.I.O) are voting on the new national contract with Sinclair Oil Corp., which will become effective June 1, upon ratification.

Among features of the contract noted by O. A. Knight, union president, are arbitration of all grievances and disputes, moving expenses of employes paid up to $25, 3 weeks' full sick pay instead of 2 and 12 weeks of half-pay instead of 8, and increased travel-time allowance. Sinclair and the oil workers union have maintained nationwide contractual relations since 1934.

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

An International Issue

OBSERVERS of international affairs are predicting that petroleum operations of certain European countries will become the proving ground in determination of policies having immediate and permanent significance.

The Russian military is now in control of the petroleum resources within Romania, Poland, Hungary and parts of Austria and Germany. Although the producing, refining and distributing capacity is not large as petroleum operations are measured in this country, they are of major importance to the areas in which they are located. They represent, in fact, all but a small part of the European crude-oil output outside Russia and include new areas whose potentialities were only partly determined at the start of the war. The refinery capacity in prewar days was sufficient to absorb the crude-oil supplies.

Most of these properties are owned by British, Dutch and American interests. These owners, going back in some instances to the early days of the European petroleum industry, have made large expenditures in developing limited production resources. Still more millions have gone into plants. Expansion of distributing facilities adapted to the varying economies of these European countries has been slow and costly.

Some of these properties in the hands of the enemy were partly destroyed in Allied offensives. Owners who cooperated by giving information that helped to neutralize the military effectiveness of these properties are entitled to consideration when Allied settlements for war damages are made.

More important now is the prompt return of these petroleum properties to their private owners. In Romania operators have not been permitted to inspect their holdings taken over several months ago by the Russian military. There have also been reports that essential operating materials and equipment of fields and refineries have been sent to Russia. Obviously the explanation of military expediency no longer holds.

The basic principle involved here is that of private ownership. Petroleum facilities by no stretch of the imagination can be considered the loot of war or part of the reparation payments by the conquered to the victor.

Equally apparent is the fact that the rights of private owners do not change in the establishment of new governments within the defeated and occupied countries. Payments to owners on a basis of values determined by competent commissions before acquisition by governments has been agreed upon in all the international discussions looking to the establishment of prolonged peace between nations.

Policies at issue extend further than the disposal and operation of oil properties within the present Russian controls. The future of the mammoth petroleum resources of the Middle East is involved, as is private oil development everywhere. Although there is a disposition in some quarters to assume that this is a problem of the oil industry only, all private business should be equally concerned in the action taken. Recognition of this fact now and prompt adoption of a sound program in Europe will end uncertainty and preclude the possibility of serious misunderstandings later.

Haynesville Plant Dedication Scheduled for June 1

DEDICATION of the Haynesville pressure-maintenance and hydrocarbon-extraction plant in the Haynesville Pettit lime pool in Claiborne Parish, Louisiana, and Columbia County, Arkansas, is planned for June 1.

Governors of Louisiana, Arkansas and Mississippi, state conservation officials and representatives of the Petroleum Administration for War have been invited to attend the dedication and observe the program for development of the field.

Soon after development started in the Pettit zone of the Haynesville field in 1942, engineers and operators initiated plans to conserve gas that came from the reservoir with the oil and compress it for return to the producing formation.

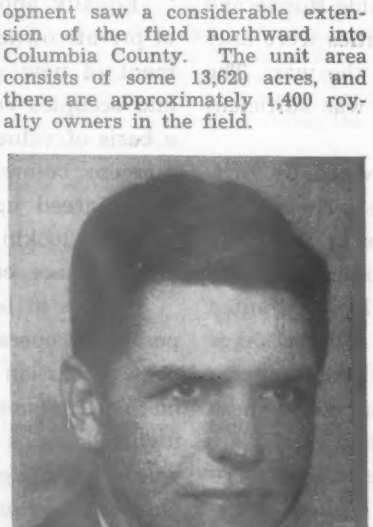
In April 1943, engineers of The Ohio Oil Co. presented the first formal report on the subject to the newly organized temporary Haynesville operators committee. This report became the basis for deliberations of the operators in numerous meetings extending over many months and culminating in final agreement as to participation factors, methods of unitization, operating plans, compressor-plant design and other complex matters incident to any unitization project. During this period, J. J. Frommer served as chairman of the temporary committee and R. H. Fincher was secretary. R. L. Benoit headed the legal committee; F. J. Decker the land committee; C. L. Moody the geological committee; F. M. Adams the accounting committee, and George M. Vandaveer, Jr., the engineering committee.

Final plans called for a plant to process 15,000,000 cu. ft. of gas per day, extract gasoline and other hydrocarbons and compress the residue for return to the reservoir. It was estimated that approximately 6,250,000 bbl. of oil will be recovered over and above what would have been recovered without repressuring. In addition, approximately 1,600,000 bbl. of gasoline and other vital hydrocarbons will be recovered. Investment in plant and pipeline systems approximates $2,000,000 but this is largely offset by saving in pumping equipment costs. The plant operating life is estimated at 20 years.

A permanent Haynesville operators committee was formed with J. J. Frommer chairman and R. H. Fincher, secretary. A separate personnel was set up to operate the field and plant, and J. R. Butler was made general manager. Butler serves in his present capacity at Haynesville and also is general manager of Cotton Valley Operators Committee. General superintendent of the Haynesville unit is H. B. Johnson, formerly field superintendent for Cotton Valley Operators Committee, and P. S. Ervin, formerly chief engineer of the Louisiana Conservation Department, is chief petroleum engineer. Fincher, formerly employed by The Ohio Oil Co. at Shreveport, is accountant and office manager. Charles Sweeney is plant superintendent.

Engineering techniques developed for completing Pettit lime wells in the Haynesville pool and some of the reservoir characteristics are discussed in a related article starting on page 137 of this issue. Technical reports on the hydrocarbon-extraction plant and an elaboration on the reservoir conditions will appear in subsequent Journals.

The Pettit lime field now has 180 wells completed at depths from 5,300 ft. to 5,500 ft. Early development was on the Louisiana side of the Arkansas-Louisiana state line in Claiborne Parish, while later development saw a considerable extension of the field northward into Columbia County. The unit area consists of some 13,620 acres, and there are approximately 1,400 royalty owners in the field.



J. R. Butler, general manager, Haynesville Operators Committee, and general manager, Cotton Valley Operators Committee

Jones & Laughlin Supply Co., Tulsa, engineering and construction division, contractors, commenced construction of the pressure-maintenance and hydrocarbon-extraction plant in July 1944 and proceeded under adverse circumstances in regard to securing material and skilled labor until April 1945. Approximately 105 miles of pipe lines necessary for gathering oil and gas and injection of gas were constructed by Sharman & Allen, contractors, of Houston. First gas was injected into the formation on January 24, 1945, and there are now six wells used for injection purposes. The extraction facilities were placed in operation on March 16, 1945, and, the plant is currently producing approximately 16,000 gal. of natural gasoline, 4,000 gal. of isopentane and 10,000 gal. of butane per day. These products are used in blending 100-octane aviation gasoline.

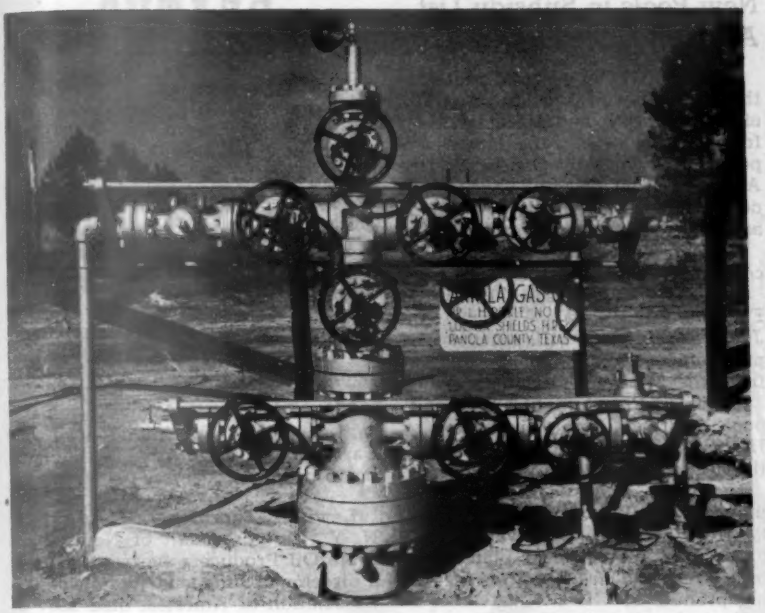
The field is currently producing approximately 6,000 bbl. of oil and 16,000,000 cu. ft. of gas daily. Of the gas produced, approximately 13,000,000 cu. ft. is injected into the reservoir and the balance is used as fuel or consumed as shrinkage.

The principal operators interested in the project are Arkansas Fuel Oil Co., Stacy & Ascher, The Blackwell Oil & Gas Co., Cook Drilling Co., Delta Drilling Co., Gulf Refining Co., W. B. Hinton, Vincent A. Hughes, Hunt Oil Co., T. L. James & Co., Inc., E. C. Johnston, Kingwood Oil Co., Magnolia Petroleum Co., Midstates Oil Corp., The Ohio Oil Co., Phillips Petroleum Co., Skelly Oil Co., Sohio Petroleum Co., Stanolind Oil & Gas Co., G. H. Vaughn, Joe B. White and a number of other owners of small interests.

Montana Is Fourteenth Member of Oil Compact

HELENA, Mont.—Gov. Sam Ford last week officially made Montana the fourteenth member of the Interstate Oil Compact Commission by signing a counterpart of the interstate agreement. Among the oil men present at the ceremony were A. E. Crumley, of Shelby, president of Montana Oil & Gas Producers Association, and vice president, Independent Petroleum Association of America, and G. C. Stevenson, of Great Falls, secretary, Montana Petroleum Industries Committee. Also on hand, in addition to state senators, were A. B. Cobb, chairman, Montana Oil Conservation Board, and members of the Montana Board of Railroad Commissioners.

The West Virginia legislature at its session just closed also enacted legislation permitting the state to join the compact. Gov. Clarence W. Meadows is expected to execute the agreement soon.



Representative dually completed well in the Carthage field. Abnormally high pressures make necessary installation of heavy fittings and connections. This well produces from the Upper Pettit and Lower Pettit zones

Carthage Area Holds Promise

(Continued from page 103)

operators have holdings within the boundaries of prospective producing limits of the field.

Development up to the past year was confined largely to a small area north and northeast of Carthage, which is near the center of the present known limits of the field. Since then, extensions have been made in long jumps, some as much as 5 to 10 miles at a time. This has left much area within the rapidly extending productive limits remaining to be developed which assures the field of continued active drilling for some time, with other major extensions probable.

Production Record

Gas production, as of March 1, totaled slightly over 54 billion cubic feet (Table 2). Liquid (condensate) recovery from this gas amounted to 834,857 bbl. (Table 3). The latter represents an average condensate yield of approximately 16 bbl. per million cubic feet (Table 5).

Current gas production, based on proration allocations for April, is approximately 130,111,000 cu. ft. daily (Table 4). Only 29 of the 54 wells (not counting dual wells) completed in the field are included in the allocations, which are for wells with pipe-line connections or other outlets. Of the 29 wells, 8 are single zone and 21 two-zone completions. Also, of the two-zone wells, only 14 have allocations to produce from both zones in which they are completed, leaving 7 of the dually completed wells producing from only one of their respective pays. Counting dually completed wells as two, there are 43 wells currently on production out of the total of 87. Potential production of the 43 wells is approximately 3,903,333,000 cu. ft. daily. Potential production for all wells in the field including those shut-in, is about double this figure.

Liquid recovery for the current gas production amounts to slightly more than 1,900 bbl. daily. (Table 4). Average liquid recovery in barrels per million cubic feet for the four producing horizons over the life of the field to date is indicated in Table 5.

Existing pipe-line outlets have a daily capacity of from 100 to 125 million cu. ft. Between 75 to 100 million cubic feet can be handled by United Gas Pipe Line' Co.'s 22-in. line, and about 25 million cubic feet by Arkansas Louisiana Gas Co.'s 12-in. line. The former line extends from the Waskom gas field near Shreveport to the Gulf Coast, ties in with the company's South Texas and South Louisiana systems on the south, and with its North Texas, North Louisiana and eastern systems on the north and has additional indirect connections with the company's central Texas system. United's proposed 24-in. line direct to Monroe will provide an additional 100,000,000 cu. ft. daily outlet capacity for the field. United has another 16-in. and 14-in. trunk line, extending from the Waskom area to southeast Texas and south Louisiana systems, which passes about 15 miles east of the field.

So far, Arkansas Louisiana Gas Co. has the only gasoline plant in operation in the field. This plant, completed about a year ago, is in the original or northeastern part of the field. It has a gas throughput capacity of 25,000,000 cu. ft. daily. Residue gas supplies the company's pipe line from the field. Due to pressure limitations of the 18-mile line which was laid with reclaimed pipe, the plant was designed to operate at the relatively low pressure of approximately 400 psi., although well pressures in the field are abnormally high.

Arkansas Louisiana is planning to build another plant in the south part of the field. Initially, this plant will have a capacity of 50,000,000 cu. ft. daily, operating at a pressure of 1,000 psi. Later, additions will be made to increase its capacity to approximately 100,000,000 cu. ft. daily.

United Gas Co. now has under construction a high-pressure plant, also in the south part of the field, which will have a daily gas throughput capacity of approximately 100,000,000 cu. ft. Roger Lacey and Lone Star Gas Co. also propose to build a 50,000,000-cu. ft. plant, to be located in the northwest part of the field.

Particular interest now is centered on the reported plans of a group of operators in the field to build a Fischer-Tropsch unit, which, if erected, will be the first commercial installation of this kind in the country.

Reservoir Data

The four currently productive horizons in the field and their respective general depth ranges are listed in Table 1. The Hill, Upper Pettit and Lower Pettit zones, the first three zones in order, are members of the Trinity Group in the Lower Glen Rose formation. Each consists of oolitic limestone. The Travis Peak zone, underlying the Glen Rose, is a sandstone. In areal extent of their respective production, the Hill zone has been found the smallest. It is the only zone which has been fairly well defined. Its porosity appears to be limited to an area forming an arc around the north and east sides of the field. The Upper Pettit and Lower Pettit zones have been the most extensively productive horizons, both having porosity, although not uniformly, under the greater part of the developed field. The Lower Pettit zone in reality consists of five members or stringers which have varying continuity of development over the field. Porosity in the Upper Pettit also shifts from the upper part to the lower part of the section northeastward across the field. The Travis Peak appears to be dis-

tributed over a large part of the structure although relatively few wells have been completed so far in this horizon.

The structure is of a large, low-relief, domal type. Structure, however, does not control the production. Instead, porosity is the determining factor in each zone. Productivity of wells varies with the degree porosity found by them in the respective zones. Likewise, the productive limits of the individual zones will be defined by lack of porosity more than by position of the wells on structure. As porosity cannot always be coincident in all four zones, so all wells are not necessarily productive in all these zones. However, most wells are potentially productive in at least two zones, many in three and some in four. The zone combinations in which dual wells are completed vary widely, except that the Hill zone production, as previously stated, is fairly limited to the north and east sides. It is the practice to drill all wells through the lowest (Travis Peak) zone and then complete in the pay, or two levels, showing the most favorable porosity and potentialities.

Although the Hill zone is the smallest in areal extent, wells in this horizon on the average have the greatest open flow volumes. These range from around 50 to 140 million cubic feet daily, averaging about 120 million cubic feet. Open flow volumes of Upper Pettit wells range from about 14 to 175 million cubic feet, averaging around 60 million cubic feet. Open flow volumes from the Lower Pettit zone are somewhat lower, ranging from 5 to 120 million cubic feet and averaging about 19 million cubic feet daily. Travis Peak potentials, the lowest, run from 7 to 11 million cubic feet daily. So far only seven wells have been completed in the Travis Peak.

Rock pressures have been abnormally high for the depths of the respective zones. Approximate initial pressures and present average pressure of the four zones follow:

Zone—	Initial Rock Pressure (psi.)	Present Avg. Rock Pressure (psi.)
Hill	2,300-2,500	2,100
Upper Pettit	2,600-2,800	2,600
Lower Pettit	2,700-3,000	2,700
Travis Peak	2,400-2,600	2,400

Development of the field is on a pattern of one well to 640 acres. No well can be drilled closer than 3,960 ft. from any other well or 1,320 ft. from a boundary line. Excess acreage up to 10 per cent is permitted for proration allowances when the shape and size of the producing tract warrants. Production allowables for each zone are based on two-thirds credit to well-head pressure and one-third credit to open flow volume.

New Pools in Subsidy List Are Announced by OPA

WASHINGTON.—Pools added to the stripper-well subsidy program, effective May 1, and a tentative list for inclusion as of June 1 were reported this week by Office of Price Administration. Some changes in designations were made. Additions as of May 1:

Kansas—Grunder, Stafford (high cost), at 9 cents per barrel.

Louisiana — Timbalier Bay, La Fourche (high cost), 35 cents. The June 1 revisions will restrict the premium payment to production from the Miocene horizon.

Texas — Premium of Clabberhill pool, Andrews County, restricted to Holter horizon. Parker, Andrews (high cost), 24 cents.

Kentucky — A specific order removes Powells Lake, Union County, from list. This pool was discovered after the subsidy plan went into effect and has not been receiving premiums.

Tentative list for June 1:

Oklahoma—Skiatook, West, Osage, 35 cents.

New Mexico—Getty, Eddy, premium raised from 14 cents to 18 cents on reapplication.

California—Capitan (Sespe) restricted to production to 3,000 ft., premium unchanged.

Texas—Angelton, Brazoria County, removed from list.

Kelly Appointed to PAW Post

WASHINGTON. — Richmond K. Kelly, of Maplewood, N. J., has been appointed assistant director of the Petroleum Administration for War's division of Supply and Transportation in charge of the tanker and inland waterways sections, according to Deputy Administrator Ralph K. Davies. He succeeds W. R. Lang, who resigned several months ago to return to private industry.

Kelly formerly was assistant vice president and marine manager of Tide Water Associated Oil Co.'s eastern division.

Share Your Journal With a Service Man

This issue of The Oil and Gas Journal can be mailed to any service man in the United States for 6 cents.

Due to weight restrictions, it cannot be remailed to an APO or Fleet address unless requested by a service man.

DEATHS

Jack E. Savage, 25, chief machinist's mate, USNR, formerly with Manning & Brown, Inc., drilling contractors, has been killed in action in the Pacific. He is the son of C. E. Savage, of the Carter Oil Co., Billings, Mont.

R. A. Underdown, 45, drilling contractor of Joinerville, Tex., died May 4, of a heart attack.

John L. Bickel, 60, for many years an oil producer, died May 3 at his home in Coal Hill, Pa.

Thomas Perry Padden, 50, Rodessa, La., district superintendent of the Carter Oil Co., died April 29. He had been in the oil business for 34 years.

Lewis H. Thornton, 76, Wellsville, N. Y., first president of New York State Oil Producers Association and a director of Independent Petroleum Association of America, died May 9 in a Rochester, N. Y., hospital. He was president and general manager of Wellsville Oil Co. and Thornton Producing Co. and managing partner of Thornton Co., all holders of leases in Ohio and Oklahoma and in the Allegany field of New York. He was a graduate of University of Rochester.

Thomas C. Jones, 77, president of Delaware (Ohio) Gas Co., died last week. He joined the gas company in 1891 and had been its head since 1924.

L. L. Colbert, 42, of the Rowe Brothers Drilling Co., died May 10 at his home in Walters, Okla. Funeral services were held Sunday, May 13.

Staff Sgt. Everett Rawlings, store manager and field representative for Bethlehem Supply Co. at Wewoka, Okla., when he entered military service in February 1943, died April 16 in a Hawaii hospital from wounds suffered February 3 in the battle of Luzon. A memorial service for Sergeant Rawlings was held May 13 in the Baptist church of Wewoka.

Texas' June Quota Calls For More Natural Gasoline

WASHINGTON. — A production rate of 2,333,000 bbl. daily of all petroleum liquids is certified to Texas for June 1945 by the Petroleum Administration for War.

This rate represents an increase of 1,000 bbl. daily over the volume certified for production during May 1945. This increase is expected to come from natural gasoline since the crude-oil production rate remains at 2,170,000 bbl. a day.

Thet thar's a alky still whut is a still.

Yup, makes ourn look like a squirrel 'side of a houn' dog.

How come the revenooers don't come after it?

Ain't ye heerd? Guvmint's buyin' th' stuff — fer our warbirds.

There are twenty-eight UOP "HF Alky" units in successful, commercial operation, producing an enormous quantity of alkylate required for aviation gasoline.

CATALYTIC CRACKING
CATALYTIC REFORMING
HYDROGENATION
ALKYLATION
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THERMAL REFORMING
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Automatic Tank-Battery Switching Method Saves Time, Mileage, and Gas Waste

by Kenneth B. Barnes

A WELL-DESIGNED and efficient automatic tank-battery switching method has proved to have several worth-while advantages. It is now in use for the fifth year on one large group of leases in a West Texas field. The system provides for the closing in, separately, of the flow manifold, and also each well at the well head, when the tank battery or any selected portion has been filled and is ready for the pipe-line gager to run.

Results of the new arrangement have been to utilize switcher's time some 66 per cent more productively, to reduce car mileage in handling the various tank batteries and individual wells approximately 50 per cent, and in lowering the average produced gas-oil ratio by 100 cu. ft. per barrel.

Operating principle of the automatic hookup is shown in Fig. 1. An 8-in. float control or kidney valve is installed on the 2-in. riser connected to the b.s. drawoff at the front end of the battery, and mounted at the "full" level position for the tanks. The lever arm from the float is mechanically linked to a small pilot valve which opens or closes a gas-pressure supply. Fig. 2 is a photograph of the float control and attached gas-pressure pilot valve. The linkage arms and pilot-valve mechanism are enclosed in a small welded-steel weatherproof box.

Fig. 2—(Above) The shutting off is started by float control (kidney valve) attached to gas-pressure pilot valve, all housed in steel box

While the tank battery is being filled (which in the installations described are 210 and 300-bbl. welded-steel tanks), two to four of the tanks are equalized through the b.s. drawoff line and filled at one time. The float valve rises when the tanks become full, and the linkage opens the gas-pressure-supply pilot valve. This valve passes the gas pressure through a ¼-in. line to a diaphragm valve located between the flow header and separator. Fig. 3 is a photograph showing the mounting of the diaphragm valve.

Fig. 3—Actual shut off is done by diaphragm valve on discharge of flow manifold to flow separator. Orifice-meter setting and back-pressure relief valve on vent line is in background

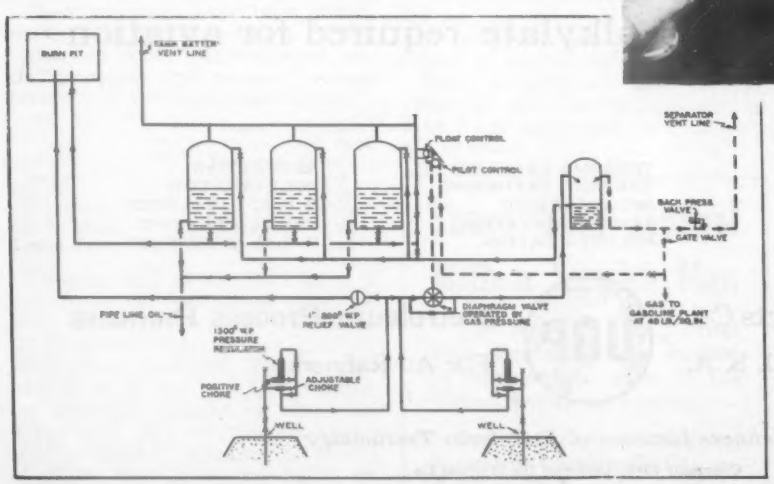

Fig. 1—This positive-action switching installation closes the well manifold automatically when tankage is full, ready for the pipe line. Switcher does not need to be present. It has saved time, driving mileage, and lowered gas-oil ratios

Closing of the diaphragm valve on the manifold line causes a back pressure to build up in the flow lines to each well. When the back pressure in the various lead lines increases to 95 psi., a pressure regulator at each well closes off. These are fitted in the bypass line in the christmas tree assemblies. Details of an individual well head hookup are shown in Fig. 4, and Fig. 5 is a photograph of the christmas tree at one of the wells.

Reason for using the pressure regulator or shutoff at each well

is to protect the manifold fittings at the central tank-battery installation from bursting. These fittings were of 125 psi. w.p. rating. Otherwise, if the pressure regulators had not been used at the individual well heads, when the diaphragm valve on the central manifold assembly closed, full tubing head pressure could build up in the flow lines to that point.

To prevent excessive pressure building up in the flow lines, in case one of the individual well-pressure regulators failed to close completely, a 1-in., 200-psi. w.p. spring-loaded pressure-relief valve is installed upstream to the entrance of the diaphragm valve, with a connection leading to the burn pit. Trouble from this source, however, has been negligible.

In the installations described, all of the tank batteries already had been constructed, and changeover to the automatic control system entailed merely the purchase of the float controls, pilot and main diaphragm valves, the regulators, and the attendant reconnection work. Altogether the automatic installations have been made on eight batteries which include a total of 78 tanks. As to cost, on one battery the total for the conversion for materials and labor, together with the revamping of the christmas trees of the two flowing wells, was $552. Payout from the savings obtained from all of the work was effected in 25 months.

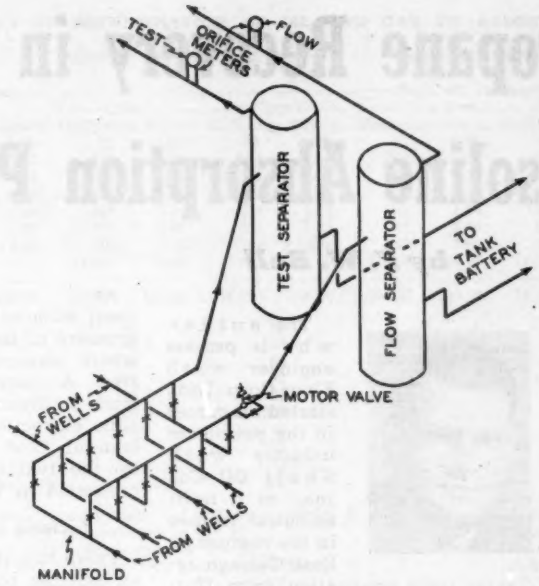

Fig. 6—(Left) System provides for taking of individual well tests. Here is layout of manifold piping. Fig. 7—(Below) One well is often "on test" through separator in foreground. Flow separator is on elevated steel structure

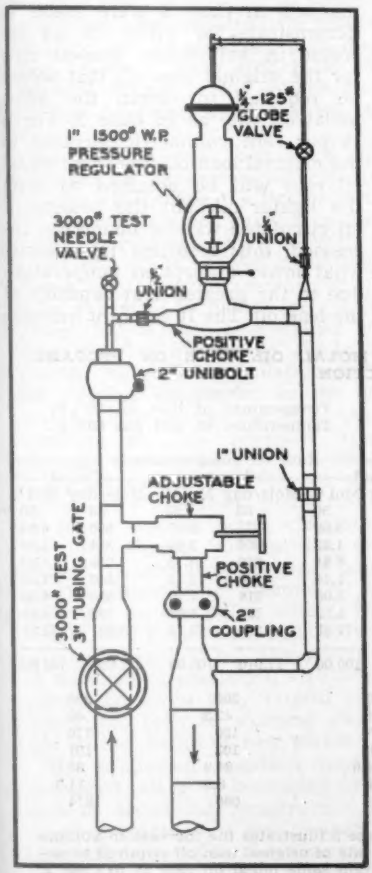

Fig. 4—(Left) Secondary shut off, to prevent pressure buildup in lead lines, is provided at each well. Diagram shows additional equipment necessary: a positive choke, 1-in. regulator, and ½-in. piping.

Fig. 5—(Below) What the secondary shut-off arrangement looks like on a typical well. On this one, a 2-in. lubricator has been attached to the tubing and a sub-surface-pressure-gage run

Reduction in average produced gas-oil ratio from the leases was achieved by the intermittent flow made possible by the installation. Each well is provided with the proper-sized choke, and the oil flow or stopcocked production is governed by the control on the tank battery. It had been found that the most efficient flow of the particular wells involved, with respect to gas-oil ratios, was obtained at a rate of 5 to 6 bbl. per hour. However, sufficient labor was not available to manually stopcock the group at this rate over extended periods. Consequently the prevailing rate previously had averaged only 2 to 3 bbl. per hour.

All of the tank batteries are provided for individual well testing, with the piping arrangement being shown in Fig. 6. For gaging purposes, flow from any particular well can be diverted to the test separator and thence to one of the tanks in the battery. Gas from the test separator is passed through a separate orifice meter run so that gas-oil ratios may be calculated for the well under test.

Increasing Propane Recovery in Existing Natural-Gasoline Absorption Plants

by F. W. Bell

BECAUSE of the continued interest in propane as a substitute for butane in liquefied petroleum gas, and as an intermediate in chemical-conversion processes, it is appropriate to consider methods by which its recovery can be increased in existing gasoline absorption plants. In a previous paper presented before the California Natural Gasoline Association, Henry Wade[1] presented an excellent discussion of the principles involved in the design of new plants for high propane recovery. These same principles apply to obtaining an increase in propane extraction in existing gasoline plants.

The problem may be considered in two phases: (1) increasing the extraction of propane in the absorber rich oil, and (2) retaining the propane thus recovered in the distillation and fractionation sections of the plant.

When considering means available for increasing propane extraction in the absorber, it is convenient to use the absorption factor as a basis. This may be defined as follows:

$$A = \frac{L}{KV}$$

where

A = absorption factor
L = rich oil from absorber in mols per unit time
V = rich gas to absorber in mols per unit time
K = equilibrium constant for component under consideration, in this case propane, at absorber pressure and temperature

Inspection of the absorption-factor equation makes it obvious that an increase in the mols of rich oil, usually obtained by increasing the lean-oil rate, or a decrease in the equilibrium constant, will result in an increase in the absorption factor, assuming the vapor rate is to be held constant. More simply, this means that an increase in the extraction of propane can be obtained by increasing the molal oil-gas ratio or decreasing the equilibrium constant.

An increase in the molal oil-gas ratio may be obtained in two ways: (1) by using a lighter oil giving more mols per gallon of oil circulated, and (2) by increasing the actual volumetric circulation rate. In an existing plant it may be quite expensive to increase the actual volumetric flow rate, since it would probably require new lean oil pumps, additional exchanger surface, and possibly revamping of the absorption and stripping column. On the other hand, it may well be possible that a lighter absorption oil could be used in the existing equipment without increasing the vapor pressure of the lean oil to the point where lean-oil loss becomes excessive. A summary of calculations made to illustrate the effect on propane extraction of increasing molal lean-oil flow with fixed gas rate by the two methods mentioned is presented in Table 1.

The author, who is process engineer with Fluor Corp., Ltd., started his career in the petroleum industry with Shell Oil Co., Inc., as a technological trainee in the company's East Chicago refinery, upon graduation from University of Michigan. He next served at Shell's Wood River refinery where his work consisted primarily of investigations in connection with lubricants and specialties, and refinery-process operating problems, particularly those concerning the gas and treating departments. In May 1941 he joined Fluor, where he has had an active part in refinery design and construction.

Basis of Calculations

These calculations were made for an existing plant in which the butane extraction is fairly low, only about 78 per cent in the absorber. By inspection of the table it will be seen that a reduction of the lean-oil mol weight from 170 as used in the plant at present, shown in Case 1, to 150, as shown in Case 2, will result in an increased propane extraction of 666 gal. per day, or 8.6 per cent. The calculations summarized in Case 3 were made to demonstrate the effect of an increase in volumetric lean-oil rate for the original lean oil that would be required to obtain the same molal oil rate as in Case 2. For a 10 per cent volumetric increase in the original lean oil, the same molal oil rate will be obtained as with the lighter oil, but the pounds of oil circulated will be materially increased, thus resulting in a somewhat lower absorption temperature due to the greater heat capacity of the lean oil. The 10 per cent increase

TABLE 1—EFFECT OF INCREASED MOLAL OIL RATE ON PROPANE EXTRACTION

Absorber pressure 135 psig. Temperature of lean oil 80° F.
No. of theoretical trays 12 Temperature of wet gas 80° F.

	Rich gas		Rich oil compositions					
			Case 1		Case 2		Case 3	
	Mols/day	Mol %	Mols/day	Mol %	Mols/day	Mol %	Mols/day	Mol %
CO_2	2,378	5.71	77	.50	85	.50	85	.50
C_1	31,933	76.67	617	3.99	675	3.97	690	4.04
C_2	2,772	6.66	281	1.82	306	1.80	314	1.84
C_3	2,504	6.01	744	4.81	808	4.75	828	4.85
C_{i4}	351	.84	222	1.44	240	1.41	246	1.44
C_4	920	2.21	773	5.00	814	4.79	834	4.88
$C_{5}+$	792	1.90	792	5.12	792	4.66	792	4.64
Lean oil			11,954	77.32	13,290	78.12	13,291	77.81
Total	41,650	100.00	15,460	100.00	17,010	100.00	17,080	100.00
Lean oil rate, g.p.m.			205		205		228	
Lean oil gravity, °A.P.I.			40		43.3		40	
Lean oil molecular weight			170		150		170	
Absorption temperature, °F.			102		103		101	
Dry gas outlet temperature, °F.			84.6		84.9		85.1	
Propane increase, per cent			0		8.6		11.3	
Propane increase, gal. per day			...		666		874	

NOTES: Case 1 is the original basis. Case 2 illustrates the use of a lighter lean oil. Case 3 illustrates the increase in volume rate of original lean oil required to obtain same molal oil rate as in Case 2.

TABLE 2—EFFECT OF REFRIGERATION OF OIL AND GAS TO ABSORBER ON PROPANE EXTRACTION

Absorber pressure 135 psig. No. of theoretical trays 12

	Rich gas		Rich oil compositions											
			Case 1		Case 2		Case 3		Case 4		Case 5		Case 6	
	Mols/day	Mol %	Mols/day	Mol %	Mols/day	Mol %	Mols/day	Mol %	Mols/day	Mol %	Mols/day	Mol %	Mols/day	Mol %
CO_2	2,378	5.71	77	.50	84	.53	81	.52	88	.55	90	.52	96	.55
C_1	31,933	76.67	617	3.99	699	4.24	652	4.17	698	4.38	725	4.19	767	4.38
C_2	2,772	6.66	281	1.82	316	2.00	299	1.91	333	2.09	339	1.96	366	2.09
C_3	2,504	6.01	744	4.81	847	5.37	796	5.09	903	5.67	912	5.27	992	5.67
C_{41}	351	.84	222	1.44	256	1.62	241	1.54	279	1.75	274	1.58	302	1.73
C_4	920	2.21	773	5.00	855	5.42	821	5.25	884	5.55	878	5.07	903	5.16
C_{51}+	792	1.90	792	5.12	792	5.02	792	5.06	792	4.97	792	4.58	792	4.53
Lean oil	....	....	11,954	77.32	11,956	75.80	11,956	76.46	11,953	75.04	13,290	76.83	13,282	75.89
Total	41,650	100.00	15,460	100.00	15,775	100.00	15,638	100.00	15,930	100.00	17,300	100.00	17,500	100.00
Temp. gas in, °F.			80		80		60		60		80		60	
Temp. gas out, °F.			84.6		68.3		78.5		64		65.9		62.5	
Temp. oil in, °F.			80		60		80		60		60		60	
Temp. oil out, °F.			102		92		97		86		94		86	
Absorption temp., °F.			102		92		97		86		94		86	
Lean oil rate, g.p.m.			205		205		205		205		205		205	
Lean oil gravity, °A.P.I.			40		40		40		40		43.3		43.3	
Lean oil mol weight			170		170		170		170		150		150	
Propane increase, per cent					13.8		7.0		21.4		22.6		33.3	
Propane increase, gal. per day					880		541		1,653		1,748		2,579	

NOTES: Case 1—The original design basis. Oil and gas in at 80° F.
Case 2—Lean oil only refrigerated to 60° ft.
Case 3—Rich gas only refrigerated to 60° F.
Case 4—Lean oil and rich gas both refrigerated to 60° F.
Case 5—Lighter oil used with same volume rate as before Lean oil only refrigerated to 60° F.
Case 6—Same as Case 5, with rich gas and lean oil both refrigerated to 60° F.

in volumetric lean-oil rate gave an increase in propane extraction of 874 gal. per day, or 11.3 per cent. Since we are interested here only in methods for obtaining an increase in propane recovery, we will not discuss in detail the effect of these changes on butane recovery, but attention should be called to the fact that an increase in butane extraction also resulted. In plants that are already obtaining high butane recovery there would be no material change in the butane extraction by these small changes in lean-oil rate.

No attempt has been made to evaluate the increase in absorption-oil loss when using the lighter lean oil, since it is quite possible to use a narrower-boiling-range oil with a lower end point without materially increasing the vapor pressure of oil from the still. In actual fact, it is likely that the use of a lighter oil may make it possible to obtain a greater volumetric circulation with the existing equipment, as the oil will have a lower viscosity, thus resulting in less pressure drop through the exchanger and lines. It should also be pointed out that the use of a lighter oil would result in fewer pounds being circulated per unit volume so that the exchange equipment could easily handle the increase in volumetric oil rate up to the point where the weight of oil circulated equaled the original weight of oil. The problem of selection of absorption oil should always be given very careful consideration, both in existing plants and in the design of new plants.

The equilibrium constant may be decreased either by increasing pressure or decreasing temperature. In existing plants it is not ordinarily practical to increase the absorption pressure, so that we will consider only means for reducing the absorption temperature. This may be done by refrigeration applied to the lean oil, rich gas, or both. The distribution of cooling between the oil and gas should be carefully studied since it is possible to cool the oil too much without also cooling the gas. Consideration must be given to the heat of absorption, heat capacity of the oil, and heat capacity of the gas to determine the proper distribution of cooling between oil and gas. Each case must be considered individually. A summary of calculations made to illustrate the effect of refrigeration on propane extraction is presented in Table 2.

The same absorption case was used in preparation of Table 2 as in Table 1. It was assumed that the oil or gas could be cooled to 60° F. from an original temperature obtained with water of 80° F. In all cases it was assumed that the volumetric lean-oil rate would be held constant at 205 g.p.m. with a rich gas rate of 41,650 mols per day. Case 1 illustrates the absorption obtained with water cooling only. Case 2 illustrates the effect of cooling the oil only. The propane extraction increased 880 gal. per day, or 13.8 per cent. Case 3 illustrates the effect of refrigeration of the gas only to 60° F., resulting in an increase in propane extraction of 541 gal. per day, or 7 per cent. Case 4 illustrates the effect of refrigerating both the oil and gas to 60° F., resulting in an increase in propane extraction of 1,653 gal. per day, or 21.4 per cent. Since it is possible to use a lighter lean oil because of the lower temperature at the top of the absorber resulting in a lower partial vapor pressure of the oil at this point, it is desirable to include calculations showing the effect of combining a lighter lean oil with refrigeration. Case 5 illustrates the use of 150-mol weight oil in place of 170-mol weight with the lean oil only refrigerated to 60° F.,

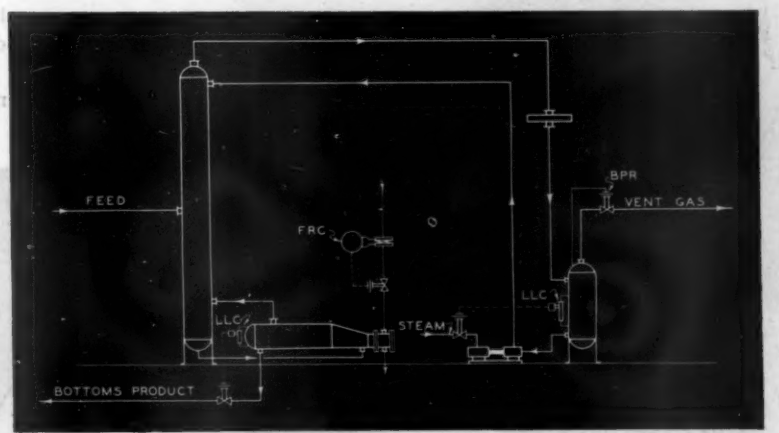

Fig. 1—Flow-rate controller on the steam to the reboiler

then he said to himself

"Phooey on every good thing"

FEW men are more widely known, and more genuinely detested, than Fuehrer Vidkun Quisling.

. . . and yet few are his orations by which to measure him.

Recently, however, as the Church gained ascendency in Norway, he resorted to a three-word outburst which pictures his double-cross mentality to a T. Says he:

"Religion is outdated."

Well he knows in his stony heart and warped soul that the advance of religion is something that will undo him

. . . so he ridicules it rather than accepts it.

Since when has he ever TRIED religion?

Many men are all too prone to deride that which they do not know *from first-hand experience*

. . . when it is only from first-hand experiences that faith is developed

. . . and that goes for commercial faith as well.

giving an increase in propane extraction of 1,748 gal. per day, or 22.6 per cent. Case 6 illustrates the use of the lighter lean oil with refrigeration of both gas and oil to 60° F., resulting in an increase in propane extraction of 2,579 gal. per day, or 33.3 per cent.

It should be pointed out that the temperature to which the streams can be refrigerated is limited by the point of hydrate formation. There are several references giving data on hydrate formation conditions, among which are Katz[2] and Bechtold.[3] Bibliographies included with these papers give practically complete coverage of the literature on hydrocarbon hydrates.

The equilibrium constant can also be reduced by using intercooling to obtain a reduction in the absorption temperature where the temperature rise without intercooling exceeds 15° to 20° F. No calculations are presented covering the use of intercoolers, but it should be pointed out that where intercoolers are used it is important that they be properly located in the absorber and that the oil circulation be maintained in order to increase the extraction of propane. The location of the intercoolers is a function of the gas-oil ratio which affects the temperature gradient in the absorber. In general it is difficult, from a mechanical standpoint, to add intercooling to existing equipment.

Addition of Trays

Another way in which the propane extraction may be increased is by the addition of trays in the absorber or by improving the tray efficiency of existing absorbers. Increasing the number of absorption trays is effective on propane extraction only where the absorption factor is between approximately 0.6 to 2.0, depending on the number of theoretical trays in the existing absorber. This may readily be understood by the reference to the Brown[4] absorption-factor diagram. Revamping or addition of absorber trays is a somewhat expensive and mechanically difficult task in an existing plant.

The next phase to be considered in the problem of increasing propane recovery in existing absorption plants is the retention of the propane in the distillation and fractionation steps. Since every plant will differ in the matter of venting and stripping of the rich oil, these problems must be considered for each individual plant by someone competent to make the necessary process study. The main problem is to determine how best to dispose of the increased pickup of methane and ethane in the rich oil necessarily resulting with the increased propane extraction. The still vapor may be recycled to the main absorber or reabsorber, compressed and condensed, or compressed direct to the stabilizers. The amount of the still vapors may be materially reduced, or even entirely eliminated, by the use of stabilizer bottoms recycle[5] to the still final condenser. It should be noted, however, that stabilizer-bottoms recycle is effective only where the vapor pressure of the stabilizer-bottoms product is considerably less than the vapor pressure of the still overhead product. This means that in general the still accumulator pressure must exceed 50 psig. for effective use of stabilizer bottoms recycle. One point which might be overlooked when attempting to use stabilizer-bottoms recycle is that it is necessary to obtain thorough mixing of the recycle liquid with the still-product vapor in the condenser, which requires that the condensers, where atmospheric, be of the upflow type, or where shell and tube to give the necessary mixing by effective baffling.

It is often desirable to recycle only a sufficient amount of the stabilizer bottoms to prevent the still overhead vapor from building up a high internal cycle through the absorption step. Where stabilizer bottoms recycle is used to reduce or eliminate recycle vapors to the absorbers the advantage is twofold since it reduces or eliminates recompressor horsepower and makes the lean oil available for primary absorption of the plant inlet streams rather than secondary absorption of recycle gas.

Retention of Propane

The final point to be considered is retention of the propane in a deethanizer column. This is another place where refrigeration should be considered because it is possible to reduce the amount of propane loss required for the production of reflux for this column by reducing the condensing temperature. The temperature to which the deethanizer overhead vapor may be refrigerated is again limited by the hydrate formation temperature.

One more thing that should be considered in connection with the deethanizer is the method of control to be used for maximum retention of propane. This is illustrated in Fig. 1 in which is shown a flow-rate controller on the steam to the reboiler to obtain constant heat input with a liquid-level controller on the reflux accumulator controlling the reflux returned to the column so that all liquid condensed in the overhead condenser will be returned as liquid to the column. By the use of constant heat input to the column to obtain the desired stripping of ethane from the bottoms with a return of all liquid formed in the overhead condenser, maximum retention of propane is obtained regardless of cooling-water temperatures.

To summarize the problem of increasing propane recovery in existing gasoline absorption plants, there are four things that can be done without making expensive or radical changes and with a minimum of shutdown time. These are:

(a) The use of a lighter absorption oil.

(b) The use of refrigeration on the lean oil and rich gas and deethanizer overhead.

(c) The use of stabilizer bottoms recycle to the still final condenser.

(d) The use of the deethanizer control method as described.

All of the methods should be given careful study to determine their economic feasibility before making any changes in a plant.

References

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3. Bechtold, I. C., Formations of Hydrocarbon Hydrates, California Oil World, Mar. 2, 1942, Apr. 1, 1942.
4. Brown, G. G., and Souders, Jr., Mott, Fundamental Design of Absorbing and Stripping Columns for Complex Vapors, Ind. Eng. Chem., p. 519, May 1932.
5. U. S. Patent No. 2,184,596.

BOOKS

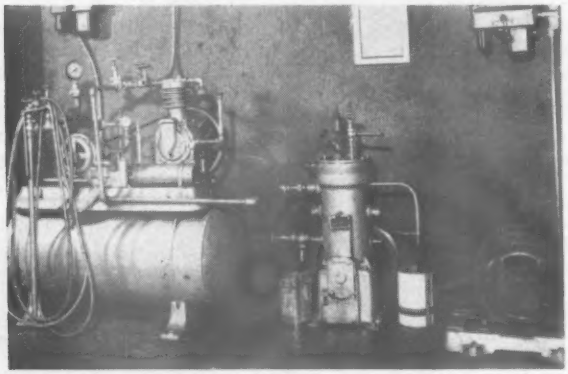
THE CHEMISTRY OF ACETYLENE. By Julius A. Nieuwland and Richard R. Vogt. Published by Reinhold Publishing Co., 330 West 42nd Street, New York. 219 pp. $4.

In this work an attempt is made to present a brief but fairly complete account of the preparation, properties, and reactions of acetylene along with an extensive classified bibliography. The volume is one in a series of scientific and technologic monographs of the American Chemical Society. The arrangement of the work is based entirely on a classification of the methods of preparation and type reactions of acetylene, rather than on considerations of historical sequence or industrial status. The introduction points out that in any treatise on acetylene numerous references to other acetylene compounds are inevitable. In the first place many of these are best prepared by substitution in acetylene. The substitution products in turn serve as intermediates in many useful laboratory preparations; accordingly, a short section has been included which points out the principal stepwise syntheses from acetylene through substituted acetylenes. Secondly, many reactions of acetylene are best understood by comparison with parallel reactions of other acetylenic compounds. Historically, a number of reactions were first applied to other acetylenic hydrocarbons and were later adapted to acetylene, and this order of development is still common, because reactions of acetylene are often more complicated and difficult than those of other compounds of the series. For these reasons numerous reactions of other acetylenic compounds are cited.

Plant Practices

Laboratory Vacuum Pump

THE main control laboratory requires a vacuum system in service 24 hours every day in the year. The usual commercial pump causes frequent trouble from failure of various parts. To overcome this, the following setup was made: A single-cylinder vertical air compressor developed a crack in the water-cooling jacket,



necessitating its replacement. The old compressor with its broken jacket was installed with a low-speed motor and a three-part V-belt drive at the control laboratory. The compressor intake is connected to the vacuum system and discharge is to free air so no cooling is required. When this pump is down for cleaning, the vacuum is maintained by starting up the small adjacent compressor which is not in constant use for air. The vacuum system is piped to compressor suction. By this means 15 to 20-in. vacuum is maintained at all times. In the 7 years' service, this pump has been down only twice for cleaning.

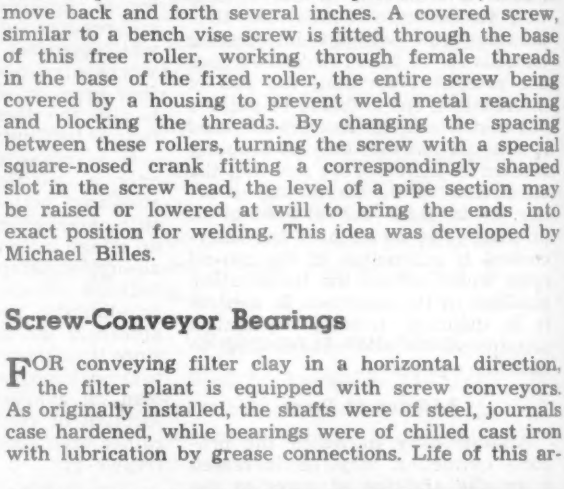
Adjustable Pipe Rollers

ADJUSTABLE pipe rollers are employed advantageously in lining up pipe sections which are to be welded. These are made, as shown in the photograph, by welding one roller base to a ¼-in. plate about 14 in. long and 6 to 8 in. wide. Pieces of rod or pipe of about ½-in. thickness are bent at each end and the

ends welded to this plate, passing alongside the fixed roller base and extending parallel to each other almost the length of the plate. The second roller of the set is fitted with a small base plate the opposite edges of which slip underneath the raised parallel rods, free to move back and forth several inches. A covered screw, similar to a bench vise screw is fitted through the base of this free roller, working through female threads in the base of the fixed roller, the entire screw being covered by a housing to prevent weld metal reaching and blocking the threads. By changing the spacing between these rollers, turning the screw with a special square-nosed crank fitting a correspondingly shaped slot in the screw head, the level of a pipe section may be raised or lowered at will to bring the ends into exact position for welding. This idea was developed by Michael Billes.

Screw-Conveyor Bearings

FOR conveying filter clay in a horizontal direction, the filter plant is equipped with screw conveyors. As originally installed, the shafts were of steel, journals case hardened, while bearings were of chilled cast iron with lubrication by grease connections. Life of this ar-



rangement seldom exceeded 2 weeks. Various designs that would exceed 10 days were tried, but none was effective; even an enclosed oil lubricated bearing quickly failed. To solve this problem an entirely different approach was made. It was proposed to make the shaft and bearing harder than the clay so it would not be scored, and to provide sufficient clearances for the clay itself to act as the lubricating medium. The illustration, at left, shows a shaft removed due to wear. It is built up by using an alloy, Dymonhard No. 65, as shown in the center, then ground to size shown on the right. The bearings are made of steel shell, lined by welding on a layer of Dymonhard No. 65 and ground to size. About 0.10 in. clearance is allowed on a 3-in. diameter shaft. The built-up surface on the shaft shows a hardness by Shore Sceleroscope of 80. By surfacing both shaft journal and bearing with this very hard material, the life of a bearing assembly is now about 2½ years.

The ideas described here are used in the Bayonne, N. J., refinery of Tide Water Associated Oil Co.

Kansas Sour Gas Economically Sweetened Through Small Plant

First 6 months of operation have demonstrated the installation here described to be both practical and economical. Capacity is 11,200,000 cu. ft. per day, and the amount of treating fluids lost during the process is surprisingly small. The plant includes auxiliary equipment and power necessary for operation, and testing equipment.

SOUR gas from Arbuckle lime is being economically treated for hydrogen sulfide removal in a compact plant placed in operation last fall by Stanolind Oil & Gas Co. in Zook gas field, Pawnee County, Kansas. The Girbotol absorption-regeneration process is applied with three absorbing fluids in a physical mixture in the absorption tower, and with regeneration of the fluids in a reactivator. The plant includes auxiliary equipment and power necessary for operation, and testing equipment required for control.

The plant was designed and constructed by Girdler Corp. for handling gas in volumes somewhat less than usual for plants of this type, and the first 6 months of operation are proving the installation both economic and practical. Output of the plant is to a commercial carrier serving industries and commercial consumers of the region, and this provides a long-time stable market that is part wartime now but that will be commercial-domestic in the future. The plant makes available in excess of 10,000,000 cu. ft. of gas daily to the demand.

Zook field was discovered by Stanolind by an Arbuckle test that was completed as on oil well after shutting off a high-pressure gas zone in the upper part of the stratum. Gas-oil ratios continued high, and as the oil field had no pipe-line outlet, crude was necessarily trucked out. This, combined with decreasing crude volumes and increasing gas ratios, suggested recompletion and production as a gas area. The second well of the two-well field and the discovery well were subsequently plugged back and perforated in the gas zone. The two wells are now granted a gas allowable of about 12,000,000 cu. ft. daily.

Natural gas from the wells, under a rock pressure of 1,250-lb. gage, flows into the plant through two 4-in. lines, which join at the plant. A liquid separator catches fluids carried over from the wells, and by means of an automatic inside dump discharges the fluids into a 100-bbl. storage. This unit was an addition to original design and was desirable because of the larger volume of fluid than had been anticipated. Liquids carried over into this storage consist of 15 to 20 per cent water and from 80 to 85 per cent gasoline.

Input gas to the plant, containing some carbon dioxide, water vapor, hydrogen sulfide ranging from 80 to 100 grains, is of normal content for sour gas and has a gravity of 0.62 to 0.66. It enters through an outside heat exchanger that boosts the gas temperature to around 65° to 70°. An automatic pressure regulator reduces the input to an operating pressure of 500-600 lb. at the absorber, into which the gas then flows after going through another liquid knockout to take care of any new condensation. Gas enters the lower part of the absorber, passing upward through the downward flow of absorber fluids held to a temperature of 80° F.

Fluids used in the absorber are three, in addition to water, and are present in the following order: diethylene glycol—$O(CH_2CH_2OH)_2$— 40 per cent; diethanolamine—$NH(CH_2CH_2OH)_2$—40 per cent; monoethanolamine — $NH_2CH_2CH_2OH$—10 per cent; and water — 10 per cent. The glycol, by its affinity for water, reduces the water vapor content of the treated gas while the organic alkalis take out the sulfide and also effectively reduce the carbon dioxide content.

Output gas from the absorber passes through a knockout drum to gather fluids carried over from the tower, and then goes through a scrubber before discharge from the plant as treated gas. Tests made regularly of the outlet gas show its hydrogen sulfide content reduced to below 1 grain, its dew point lowered 40° or more as required, and normal fluid or condensate content at a minimum. Plant output into a 6-in. carrier is measured by orifice meter.

Regeneration

The rich solution from the absorber passes through a bank of heat exchangers, flowing by absorber pressure, with the rate being governed by an automatic liquid-level control. Pressure is reduced from the high absorber pressure to approximately 80 lb. The mixed fluids enter the reactivator at 210° to 245° F., at the fifteenth tray where regeneration begins. The reactivator operates at pressures between 7 and 10 lb. Reflux rate is about 0.5 gal. per minute.

The fluids used in the absorber are returned to an active state in the reactivator, or regenerator, by means of heat furnished by a reboiler. Hydrogen sulfides, water vapor in excess of the permitted amount and carbon dioxide are carried off through an outlet line. They are then chilled in a cooler supplied by water from the water cooling

Main building in foreground with absorber tower to left; reactivator to right

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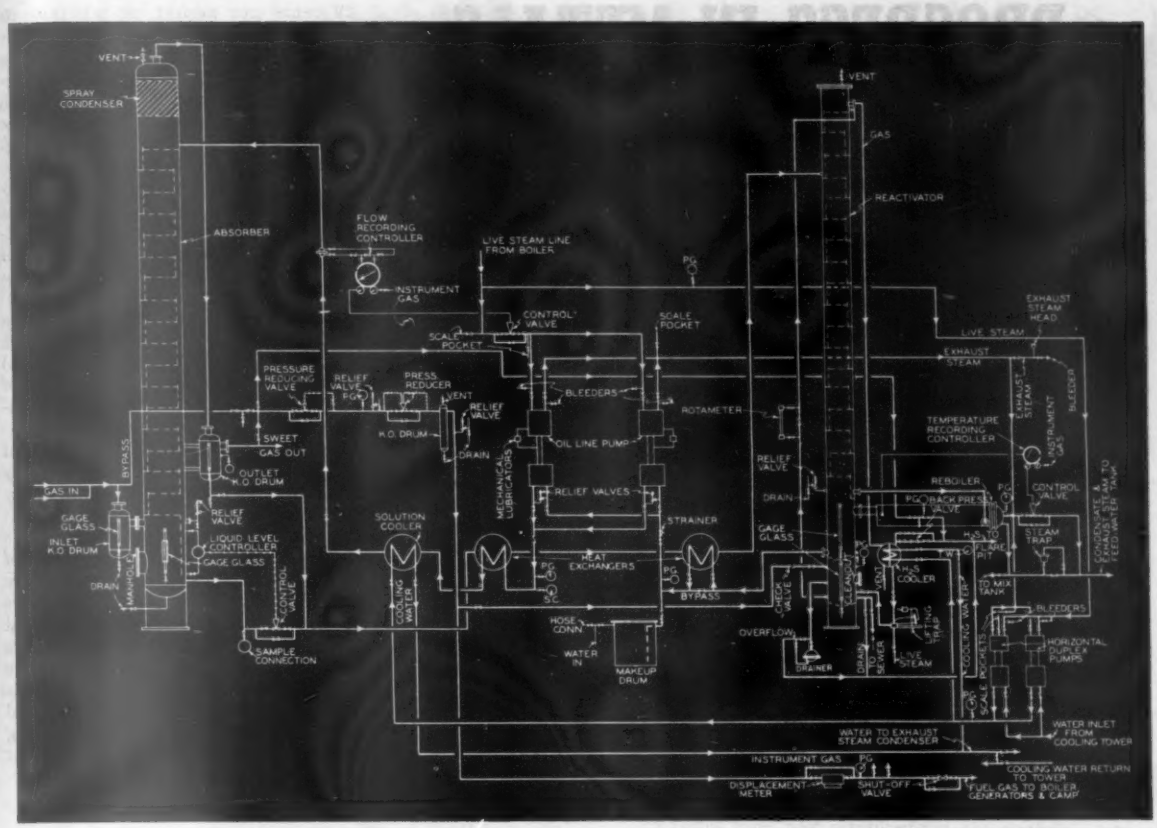


Flow diagram of gas-sweetening process

tower, uncondensed gases going to a flare.

In a reboiler at the bottom of the reactivator the rich solution reaching the bottom of the tower is heated to 270°-290°. This is below the decomposition temperature for the absorbent fluids, but well above the temperature necessary for removal of hydrogen sulfides and water vapor. The reboiler is heated by steam that has been exhausted through pumps and headers, and is automatically controlled.

General Plant

The plant is supplied with steam by a 75-hp. boiler with makeup water and water for other plant use derived from overhead storage. An 18-KVA gasoline-engine-driven generator with a similar standby unit furnishes power for the plant. The absorber and reactivator towers rise from the same main building while laboratory for plant efficiency control, boiler and power generation are separately housed. The entire layout is highly compact.

A tank is provided in which absorber fluids may be mixed. This tank, suitably heated, and with pumps automatically handling materials in or out, is located in the floor of the main building. The mixture can be made at this point under careful control rather than in an adjacent building. The tank consists of a circular steel well with necessary connections.

The entire layout is highly modern in design with particular attention being given the use of automatic controls. These have been applied wherever possible. Recording instruments indicating the functioning of the plant are mounted on a board in the main building, these providing a measure of plant control by incorporating automatic settings to remotely control equipment by pressure variations.

The use of plants of this or relative capacities for the removal of hydrogen sulfide from natural gas to render it sweet and commercially desirable is a step toward conservation by allowing gas from comparatively small fields or wells to be practically processed where formerly such low-volume outputs would have been considered too small to justify installation of the necessary equipment. The use of this process is simple, requires a minimum of attention, and is effective to a marked degree. In other Kansas fields, similar and larger plants have been in operation for years, chiefly in the Otis-Albert area and at a point east of Lyons where Cities Service Oil Co. has installed a hydrogen sulfide absorption plant for reducing the H_2S content of gas from wells in that area.

Capacity of the Zook plant is 11,200,000 cu. ft. per day although actual volumes passed have exceeded this figure at times. The amount of treating fluids lost during the process is surprisingly small, and occasions no excessive renewal expense. Plant and adjacent buildings are enclosed within a property fence which includes homes for plant engineers.

Harold Merritt has been elected president of the Saginaw Valley Oil Men's Association, succeeding **Arthur Bailey.** Other officers elected were **Lyman Fenton,** vice president; **Russell Schaefer,** treasurer; **R. L. Palmer,** secretary.

C. T. Jones, special representative of the export department of Tide Water Associated Oil Co. at San Francisco, has been named vice president of the Export Managers Association of San Francisco.

William R. Gahring and **W. A. Null,** oil men of Shawnee, Okla., have been honorably discharged from the army and are back in Shawnee, preparing to reenter the oil business.

PROGRESS IN METALS

by W. L. Nelson
Consulting Engineer

Our War-Grade Ores

AN enormous expansion of our mineral production has taken place during the war, and the cessation of hostilities will bring drastic changes. There are certain metals that are entirely lacking in the United States, such as nickel, and of course foreign sources must continue to supply such metals. Still others occur in such low-grade ores that they cannot be exploited during normal times, but there are others whose possibilities will bear further consideration. It is this last group of border-line materials that warrant consideration because they were on the verge of development before the war. Experience gained during the war has resulted in improved ore-reduction methods, lower production costs, the development of superior ores, or improved methods of concentrating the ore, all of which may justify continued production.

Among the most useful alloying elements, only nickel is totally lacking in the United States. The fact that our friendly neighbor, Canada, is the main source of nickel, is reassuring. The United States is the main producer of molybdenum and hence this element gives no concern. With respect to tungsten, vanadium, chromium and manganese, the situation is not entirely clear. According to Mineral Technologist, William H. Waggaman of the Bureau of Mines (Chem. & Eng. News, Nov. 24, 1944):

"Under war conditions and at an appreciable increase in price (for tungsten), we have been able to furnish from domestic sources the bulk of our vanadium requirements and a substantial proportion of our tungsten needs. As for manganese and chromium, while we have large reserves of submarginal ores the cost of producing suitable concentrates in the light of our present knowledge has discouraged development of all but the high and medium-grade ores."

In considering whether or not the marginal profit ores should be subsidized there are two or three factors of major importance. What is the degree of the emergency; is the metal one that must be had in case of war? Who will be hurt by stopping the import of the foreign ore and in what degree will this reflect unfavorably on the fortunes of the United States in a political way? These are bigger problems than most of us can consider, but the matter of "what will it cost us as a nation to subsidize marginal ore production?" is a question that all of our citizens, engineers, and operators can consider.

First of all, the main cost of an alloy steel is the cost of processing. Thus, improvements in the methods of processing can in most instances outweigh the advantages offered by a cheap foreign ore, can relegate the cost of ore or concentrates to a position of minor importance. This may be illustrated by the fact that 1 lb. of metallic chromium when used as a plating material will cover about 278 sq. ft. of surface. Whether the chromium cost 89 cents per pound, or whether its cost be twice this normal figure, is of no great moment inasmuch as a square foot of chromium plated surface may sell for 90 cents or even much more. Likewise the cost of the 30 tons per year of the very expensive tungsten that goes into electric light bulbs is negligible compared with the value of the millions of bulbs. Nevertheless, there is always the danger and difficulty of knowing at what expense a subsidy should be stopped.

As a further means of judging the cost of such subsidies, Fig. 1 (taken from paper of Waggaman) shows the approximate extra cost of alloy steels over the cost of ordinary steel. The base price of ordinary steel is about $30 per ton but the base cost of the good-quality steel that is used for making alloy steels, along with the cost of making the additions, etc., is about $48 per ton. With the exception of nickel, the metals of the figure were added in the form of the ferroalloys of the respective metals. In most alloy steels the alloy elements are used in small amounts and hence the cost of the alloying element is a very small percentage of the total cost; in many instances a doubling of the cost of the alloy element would not greatly affect the overall cost:

Kind of alloy or steel—	Per cent element	Per ton extra	Extra cost (per cent)
Vanadium	0.1	$5.10	10.6
Molybdenum	0.25	4.90	10.2
Nickel	3.25	24.00	50.0
Chromium	0.90	2.25	4.7
Manganese	1.90	3.10	6.5
Chromium steel	(*)	4.74	9.9
Molybdenum chromium steel	(*)	18.53	38.6

*Several elements used in customary amounts.

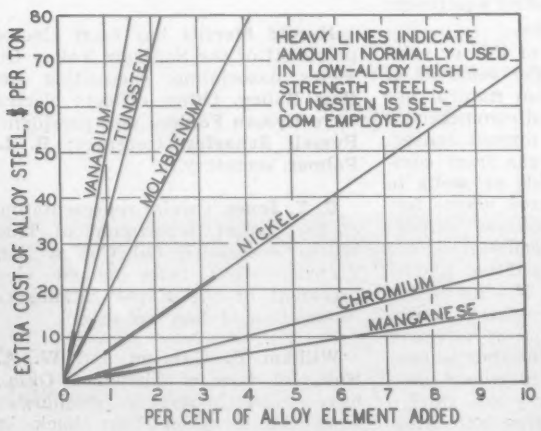
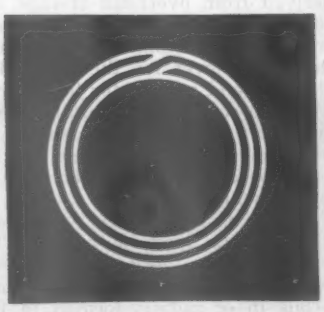


Fig. 1—Extra cost of alloy steels. Add about $50 per ton as a base price. (Courtesy Wm. H. Waggaman)

High-Pressure Tubing

THE biwall (or triwall) tubing of Bundy Tubing Co. (Detroit) as shown in the figure, should from an engineering standpoint show superior strength. Tubing produced from cold-drawn unannealed monel metal coated with copper and heated to produce bonding of the copper and monel exhibits a strength of 65,000-98,000 psi.



Cross-sectional diagram showing how the Monel strip is rolled

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Recovery of Condensate By Cycling

*by Park J. Jones**

Mechanics of Producing Oil, Condensate, and Natural Gas

PART 28 IN A SERIES

Recovery of condensate by cycling is expressed in terms of the invasion factor and the displacement factor. The invasion factor is the fraction of reservoir space invaded by injected gas. The displacement factor is the fraction of the condensate initially in place displaced by injected gas within the invaded region. Based on field experience with recovery of condensate to date, tentative data on relative permeability are included. These data are subject to revision in the light of further experience.

The recovery of condensate from 1 bbl. of reservoir space, point data, is expressed in terms of the per cent dry or wet gas in the production from a point. These data may be used to estimate condensate recovery from the region invaded by dry gas up to the time dry gas first appears in a producing well.

As more gas is injected, the following conditions obtain: (1) the recovery from the region invaded up to the time dry gas first appears in a producing well is increased; (2) the per cent of dry gas in the production increases, and (3) the area invaded by dry gas also increases. The additional recovery from the region invaded up to the time gas first appears in a producing well can be estimated from point data in terms of the per cent dry gas that would be in the production if the invaded area did not increase. However, as more gas is injected the invaded area does increase. Therefore, the relationship between condensate recovery and composition of production also depends on the invaded area.

Condensate Recovery vs. Invasion Factors

RECOVERY of condensate by cycling is equal to the product of two factors, the invasion factor (I) and the displacement factor (m). Accordingly, the recovery (r) of condensate by cycling, expressed in per cent of the condensate initially in place, is defined by:

$$r = 100\,(Im) \qquad (1)$$

where

I = invasion factor, fraction of reservoir space invaded by injected gas

m = displacement factor, fraction of the condensate initially in place displaced by injected gas

The numerical value of the invasion factor (I) depends on such considerations as structure, stratigraphy, shape of reservoirs, location and number of producing wells, and location and number of injection wells. Rates of injection and withdrawal also influence invasion factors. If 50 per cent of the space in a reservoir is invaded by injected gas, the invasion factor is equal to 0.5. If 70 per cent of reservoir space is invaded by injected gas, the invasion factor is equal to 0.7, and so on for other values.

Fig. 28-1 illustrates the area invaded by gas at the time injected gas reaches a producing well. This pattern is for one producing well and one injection well. Both wells are remote from other injection or producing wells. Both wells are also remote from faults, pinchouts, and edge water. Fig. 28-2 illustrates the area invaded relative to two producing wells equidistant from an injection well.

The invasion factor for these patterns is equal to the acre-feet of pay invaded divided by acre-feet to be invaded. For example, if the acre-feet of pay invaded were 60 per cent of the acre-feet of pay assigned to the wells in each figure, the invasion factor would be 0.6.

Condensate Recovery vs. Displacement Factors

Recovery of condensate from an invaded region varies directly with the displacement of condensate. Recovery of condensate from an invaded region is equal to the displacement factor.

In Fig. 28-1, the injected gas in the annular area (C) passed through the annular area (B). And the injected gas in the areas (C) plus (B) passed through the innermost area (A). As a consequence, the recovery of condensate from the area (A) surrounding an injection well is higher than the recovery from the adjoining (B) area. And the recovery from the (B) area is higher than the recovery from the (C) area. The displacement factor for an invaded

*Production consultant, Houston.

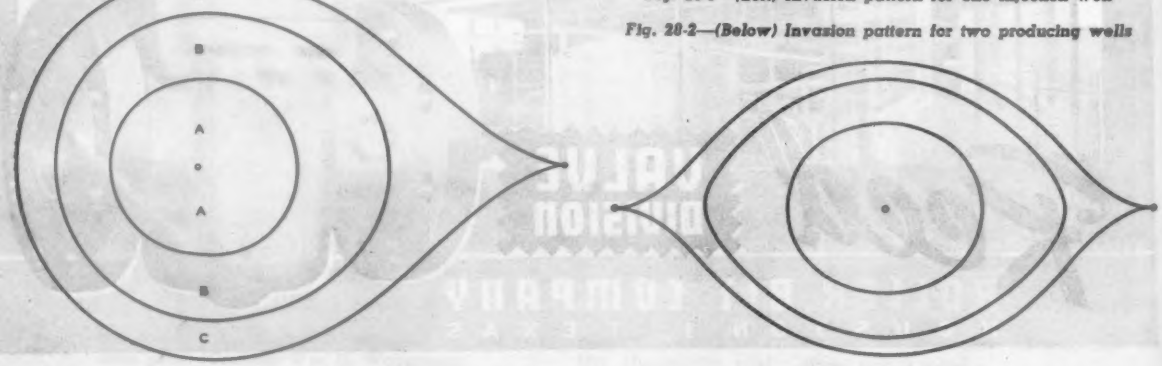


Fig. 28-1—(Left) Invasion pattern for one injection well

Fig. 28-2—(Below) Invasion pattern for two producing wells

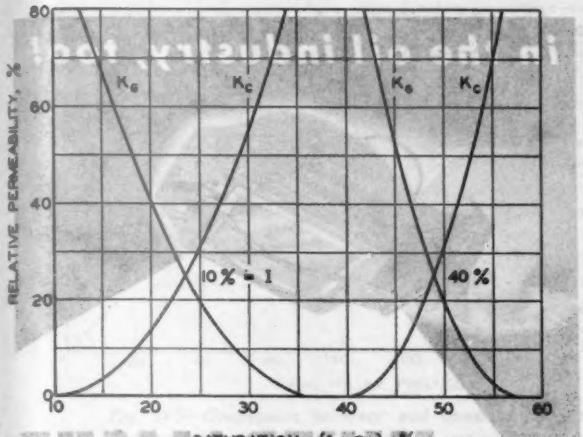


Fig. 28-3—Relative permeability (K_c) to condensate and (K_o) to injected gas vs. interstitial water (I) plus condensate (S_c) saturations; tentative data subject to revision

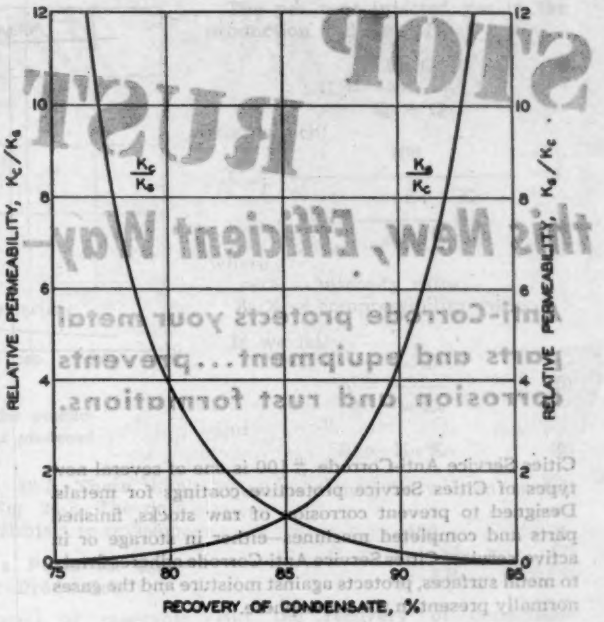


Fig. 28-4—(Right) Relative permeability ratio vs. per cent condensate recovery from a point; tentative data subject to revision

region is the average value of the recoveries from the individual points within the invaded region.

Mechanisms of Displacement

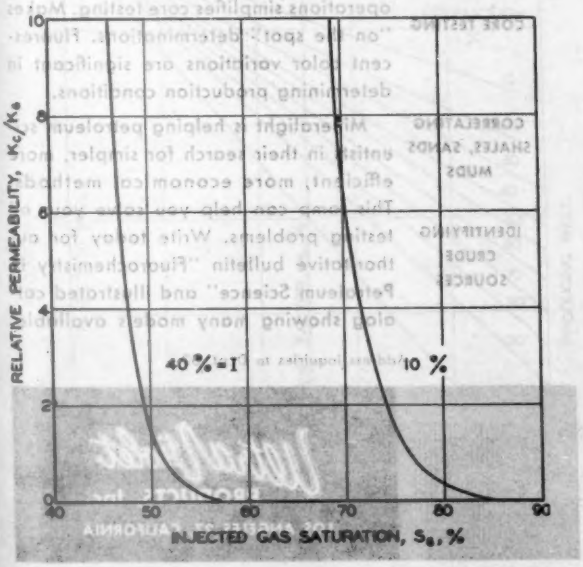
This article is limited to displacement of condensate by injected gas. Invasion factors will be considered in a later article. The mechanisms of condensate displacement by injected gas include diffusion. The first dry gas forced into a pore does not displace 100 per cent of the wet gas within that pore. A volume of dry gas equal to several times the volume of wet gas within a pore must be forced through a pore in order that recovery therefrom approach 100 per cent.

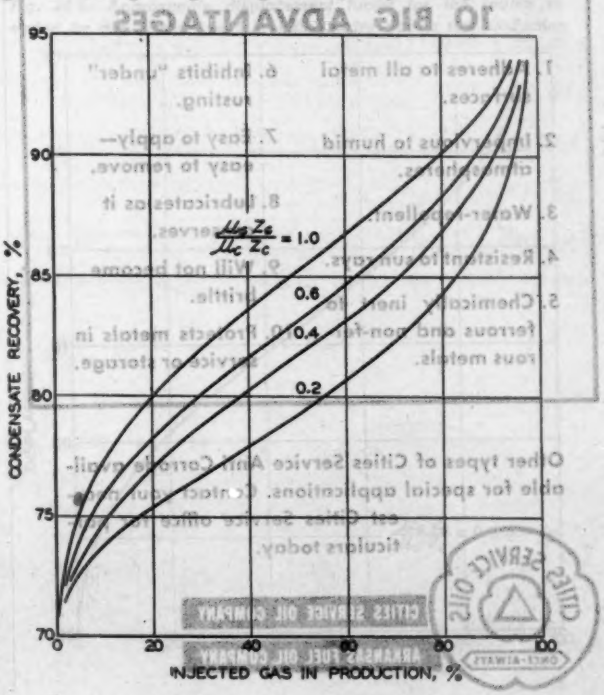
There are anywhere from 20 trillion up to 200 trillion pores per acre-foot of pay. As the interface between dry and wet gases advances toward a producing well, the dry gas is forced into an astronomic number of pores. Consequently, there is opportunity for diffusion of dry gas into wet gas and of wet gas into dry gas within each pore. The longer the path along which an interface advances, the higher the percentage of wet gas in the gas which originated as dry gas. The slower the rate of advancement of an interface, the higher the percentage of wet gas. Hence, the probability is that some of the wet gas which reaches a producing well does so by virtue of diffusion. The effect of diffusion is to reduce the volume of dry gas required to achieve a given condensate recovery.

Relative Permeability to Condensate and Gas

There are no experimental data on displacement of wet and retrograde gases by injected gas. But

Fig. 28-5—(Below) Relative permeability ratio vs. injected gas saturation and interstitial water; tentative data subject to revision. Fig. 28-6—(Right) Per cent condensate recovery from a point vs. per cent dry gas in the production; tentative data subject to revision





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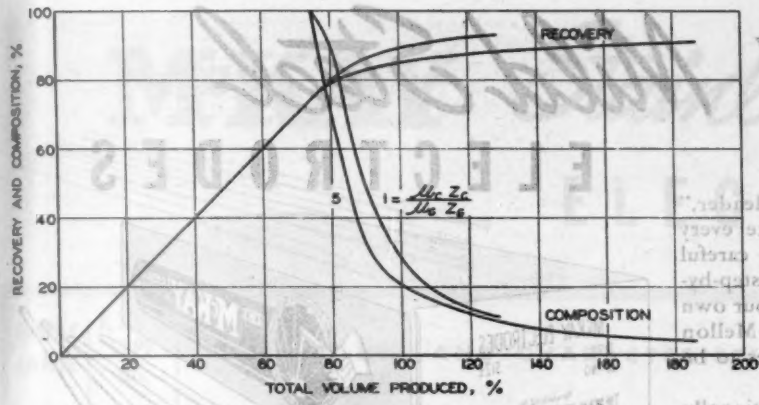


Fig. 28-7—Condensate recovery and composition of the production from a point vs. total volume of wet plus dry gas produced

based on field experience with recovery of condensate, the relative permeabilities to condensate K_c and to injected gas K_o are estimated as shown in Fig. 28-3. These data are tentative and subject to revision. The data are for pay of the type having 10 per cent interstitial water and 40 per cent respectively. Relative permeability is plotted against interstitial water plus condensate saturations.

Relative Permeability Ratios

Relative permeability ratios K_c/K_o are plotted in Fig. 28-4 against per cent condensate recovery. These data are taken from, and subject to the same limitations as those in Fig. 28-3.

Relative permeability ratios K_c/K_o are also plotted against injected gas saturation in Fig. 28-5. These data are taken from Fig. 28-3. The data are tentative and subject to revision.

Recovery From a Point vs. Composition of Production

Consider a barrel of reservoir space. The per cent injection gas in the production from a point, from a barrel of reservoir space, may be obtained as follows: The rate of condensate production in barrels per day is given by:

$$Q_c = \frac{112\,AK_c\,(P_i^2 - P_s^2)}{\mu_c\,L\,T\,Z_c} \qquad (2)$$

and the rate of injected gas production by:

$$Q_o = \frac{112\,AK_o\,(P_i^2 - P_s^2)}{\mu_o\,L\,T\,Z_o} \qquad (3)$$

The per cent injected gas in the production is defined by:

$$C = \frac{100\,Q_o}{Q_o + Q_c}$$

from which:

$$C = \frac{100}{1 + \dfrac{\mu_o Z_o}{\mu_c Z_c}\cdot\dfrac{K_c}{K_o}} \qquad (4)$$

where

μ_o/μ_c = viscosity ratio

Z_o/Z_c = compressibility ratio

If we let:

$$A = \frac{\mu_o Z_o}{\mu_c Z_c} \qquad (5)$$

and

$$B = K_c/K_o \qquad (6)$$

Equation 4 may be written as follows:

$$C = \frac{100}{1 + AB} \qquad (7)$$

But the recovery of condensate from a point corresponding to known values of B is given by the curve in Fig. 28-4. Hence, Equation 7 may be used for estimating per cent condensate recovery from a point in terms of the per cent injected gas in the production from a point. The curves in Fig. 28-6 are solutions of Equation 7.

Recovery and Composition vs. Volume Produced

In practice, the recovery of condensate and composition of production are commonly plotted against

Fig. 28-8—Approximate distribution of condensate recovery along a displacement line vs. per cent wet gas in the production

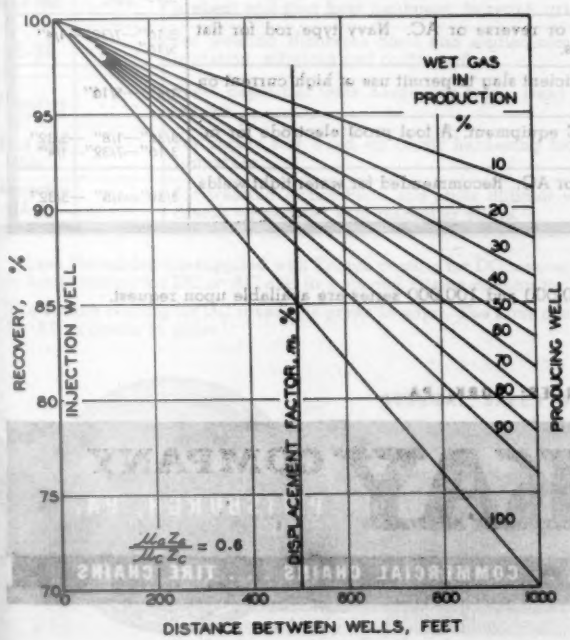
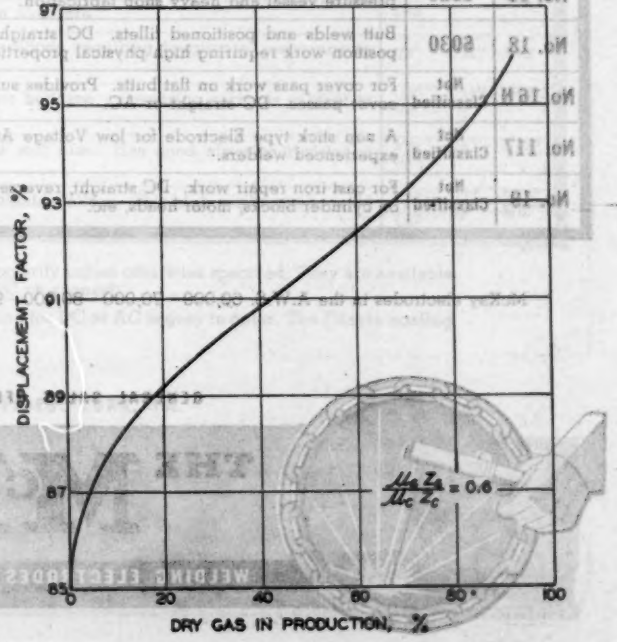


Fig. 28-9—Approximate displacement factor for the region invaded by dry gas at breakthrough vs. dry gas in the production



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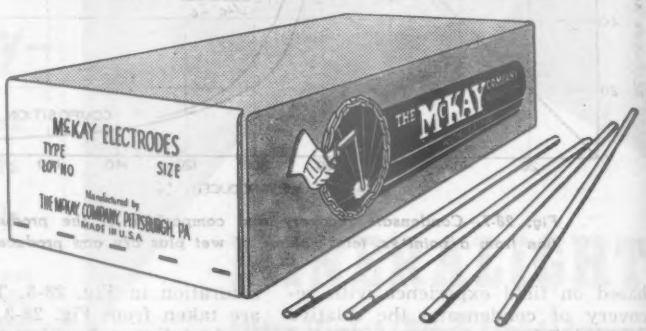
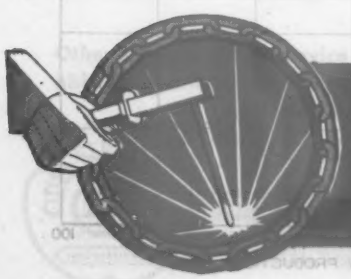


McKAY GRADE	A. W. S. TYPE No.	USE AND CHARACTERISTICS	SIZES
No. 21	4510	Sulcoated for automatic or manual welding where shielded arc physical properties are not required. DC straight polarity only.	3/32"—1/8" —5/32" 3/16"—7/32"—1/4"
No. 3	4520	Flux drawn for high speed automatic or manual welding where shielded arc physical properties are not required. DC straight polarity only.	3/32"—1/8" —5/32" 3/16"
No. 15	6010	All position shielded arc. DC reverse polarity only. Navy type electrode for shipbuilding and pipe line or structural steel fabrication.	3/32"—1/8" —5/32" 3/16"—7/32" —1/4" 5/16"
No. 11	6011	All position shielded arc. AC or DC reverse polarity. Navy type electrode for shipbuilding and pipe line or structural steel fabrication.	1/8" —5/32"—3/16" 1/4"
No. 17	6012	All position poor fit up and fillets. DC straight polarity. For general shop fabrication work.	1/16"—5/64"—3/32" 1/8" —5/32"—3/16" 7/32"—1/4" —5/16"
No. 116	6012	All position poor fit up and fillets. AC or DC straight polarity. For general shop fabrication work.	1/16"—5/64" 3/32" 1/8" —5/32"—3/16" 7/32"—1/4". —5/16"
No. 14	6013	Horizontal fillets and butts. DC straight or AC. Has fillet characteristics of 6012 type and speed of 6020 type.	1/16"—5/64"—3/32" 1/8" —5/32"—3/16" 7/32"—1/4". —5/16"
No. 16	6020	Horizontal fillets and butts. DC straight or AC. Navy type electrode for shipbuilding, pressure vessel and heavy shop fabrication.	3/16"—7/32"—1/4" 5/16"
No. 18	6030	Butt welds and positioned fillets. DC straight or reverse or AC. Navy type rod for flat position work requiring high physical properties.	3/16"—7/32"—1/4" 5/16"
No. 16 H	Not Classified	For cover pass work on flat butts. Provides sufficient slag to permit use of high current on cover passes. DC straight or AC.	1/4" —5/16"
No. 117	Not Classified	A non stick type Electrode for low Voltage AC equipment. A fool proof electrode for inexperienced welders.	3/32"—1/8" —5/32" 3/16"—7/32"—1/4"
No. 19	Not Classified	For cast iron repair work. DC straight, reverse or AC. Recommended for water-tight welds on cylinder blocks, motor heads, etc.	3/32"—1/8" —5/32"

McKay electrodes in the A.W.S. 60,000—70,000—80,000—90,000 and 100,000 series are available upon request.



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McKAY Stainless Steel ELECTRODES

McKAY GRADE	A.I.S.I. TYPE No.	USE AND CHARACTERISTICS	SIZES
18-8	308	For welding Stainless Steels from 17 Chrome, 7 Nickel to 20 Chrome, 10 Nickel. Weld metal will be equal or superior to parent metal in corrosion and physical properties.*	1/16"—5/64"—3/32" 1/8" —5/32"—3/16" 1/4"
25-12	309	For welding type No. 309 Stainless Steel and stain clad plate where higher Chrome Nickel content is desired than can be secured with 18-8 Electrodes.*	1/16"—5/64"—3/32" 1/8" —5/32"—3/16" 1/4"
25-12 Cb	309 Cb	For welding type 309 Cb Stainless Steel and for multiple pass weld where interpass temperature may be up long enough for carbides to form.*	1/16"—5/64"—3/32" 1/8" —5/32"—3/16" 1/4"
25-20	310	For welding type 310 Stainless Steel. Also widely used for welding plain Carbon Steel up to .50 Carbon and low Chrome Steels where post heat treatment is not practical.*	1/16"—5/64"—3/32" 1/8" —5/32"—3/16" 1/4"
18-8 Mo	316	For welding type 316 Stainless Steels. Molybdenum content of weld deposit 2 to 3%.	1/16"—5/64"—3/32" 1/8" —5/32"—3/16" 1/4"
18-8 Mo	317	For welding type 316 or 317 Stainless Steels. Molybdenum content of weld deposit 3 to 4%.	1/16"—5/64"—3/32" 1/8" —5/32"—3/16" 1/4"
15-35	330	For use on type 330 Stainless Steels where welds are subject to extremely corrosive agents or require heat resistance up to 2100°F.*	3/32"—1/8" —5/32" 3/16"
18-8 Cb	347	For welding type 347 and 321 Stainless Steels where welds may be exposed to service temperatures between 900°-1500°F.*	1/16"—5/64"—3/32" 1/8" —5/32"—3/16" 1/4"
12 Cr	410	For welding type 410 Chromium Steels. Weld structure is martensitic requiring preheat and post heat treatment to refine grain structure.*	3/32"—1/9" —5/32" 3/16"
16 Cr	430	For welding type 430 Chromium Steels. Weld structure is normally ferretic. Preheat and post heat treatment required to eliminate stresses.*	3/32"—1/8" —5/32" 3/16"
18 Cr	442	For welding type 442 Chromium Steels. Weld structure is ferretic and subject to grain growth. Preheat and post heat treatment required to eliminate stresses.*	3/32"—1/8" —5/32" 3/16"
28 Cr	446	For welding type 446 Chromium Steels. Weld structure is ferretic and subject to grain growth. Preheat and post heat treatment required to eliminate stresses.*	3/32"—1/8" —5/32" 3/16"
5 Cr Mo	502	For welding type 501 and 502 Chromium Steels. Weld structure is martensitic requiring preheat and post heat treatment, to refine grain structure.	3/32"—1/8" —5/32" 3/16"
15-60	....	For welding Nichrome Steel and similar compositions requiring toughness, resistance to oxidation, nitriding and carburization.	1/8" —5/32"—3/16'
Frogalloy	....	Weld deposit of work hardening type. Used for building up wearing surfaces subject to impact.	1/8" —5/32"—3/16" 1/4"
Tool and Die	....	For repair and build up of air hardening tools and dies. Has good abrasion resistance properties.	3/32"—1/8" —5/32" 3/16"
Armorloy A-8	....	For welding Armor Plate and other difficult weldable alloys. Has high resistance to weld cracks when used with dissimilar alloys.	3/32"—1/8" —5/32" 3/16"—1/4" —5/16" 3/8"

*These Electrodes are supplied with Titania coating for DC reverse polarity unless otherwise specified. They are available in Lime coating for DC or AC and in a special Titania coating for AC on request.

The Titania coating for DC reverse is green in color. The Lime coating for DC or AC is grey in color. The Titania coating for AC is cream in color.

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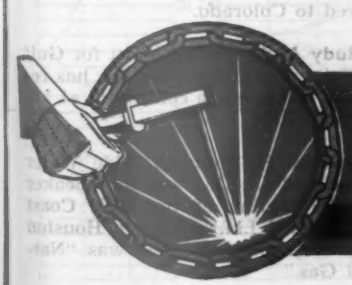

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the total volume of gas produced. Composition is expressed in per cent wet gas or condensate in the production. Recovery is expressed in per cent of condensate originally in place. Total volume produced is the sum of reservoir gas plus injected gas produced. Total volume is expressed in per cent of wet gas originally in place.

Per cent condensate in the production is given by:

$$C = \frac{100}{1 + \frac{\mu_c Z_c}{\mu_o Z_o} \frac{K_o}{K_c}} \qquad (8)$$

The recovery and composition for a point are mapped in Fig. 28-7. The curves in this figure are based on the data in Fig. 28-3. Point data will now be applied to all the points on a displacement path along which an interface between dry and wet gases advances.

The Breakthrough Displacement Factor

Consider a producing and an injection well a thousand, or more, feet apart, by the time injected gas appears at the producing well, several hundred million, or more, cubic feet of gas have been injected. The wet gas displaced from the points in the neighborhood of the injection well is practically 100 per cent. This statement is based on considerations which will be discussed in the next article.

The recovery from a point invaded by gas in the neighborhood of a producing well is given by the curves in Fig. 28-6. One method of estimating the displacement factor along the line joining the two wells is shown in Fig. 28-8. The recovery from the points in the vicinity of the producing well corresponding to a given composition of the production are joined by lines with the 100 per cent recovery at the injection well. The displacement factor along the line joining the two wells is assumed to be the average of the values at the producing and injection wells.

But, at the time dry gas breaks through into a producing well and aside from other considerations which are of minor importance, the distribution of condensate recovery along any line from the injection well in Fig. 28-1 to the interface is similar to that along the line between the two wells. Therefore, the breakthrough displacement factor is on the order of 85 per cent when the viscosity and compressibility ratios are equal to 0.6.

As more gas is injected the per cent of dry gas in the production increases. Now, if the invaded area would remain constant, the increase in the displacement factor for the area invaded at breakthrough time would be approximately as indicated by the curve in Fig. 28-9.

However, as more gas is injected the invaded area increases. The condensate recovery from the increased area influences the composition of the production. Therefore, the relationship between displacement factors and composition of production also depends on the increase in the area invaded by dry gas after breakthrough. The data in Fig. 28-9 are relative to the breakthrough invasion factor. The indicated recoveries are approximate only. A more exact method will be given in the next article.

Reference

Hurst and McCarty, A.P.I., 1941.

Ed Hannum has been transferred to Ardmore, Oklahoma, as district geologist for The Texas Co., replacing **John Marshall**, recently transferred to Colorado.

Rudy Anderson, geologist for Gulf Refining Co. at Mattoon, Ill., has resigned to become a consultant at Mt. Vernon, Ill.

William H. Vaughan, Tide Water Associated Oil Co., was the speaker at the meeting of the Gulf Coast section of A.I.M.E., held in Houston May 1. Vaughan's topic was "Natural Gas."

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Special Technique Promises to Change Future Lime-Completion Practices

by Paul Reed

THE recompletion of certain Pettit lime wells in the Haynesville, Louisiana, field has been done with a combination of several methods which together may be regarded as a special technique. Because of the significance of this new type of recompletion, conceptions of the proper procedures for handling lime production both in primary and secondary recovery may be modified. The work done for the Haynesville Operators Committee project has served as a pilot operation with a bearing on future practices in areas with lime production such as West Texas, the Texas Panhandle, and Oklahoma fields including West Edmond.

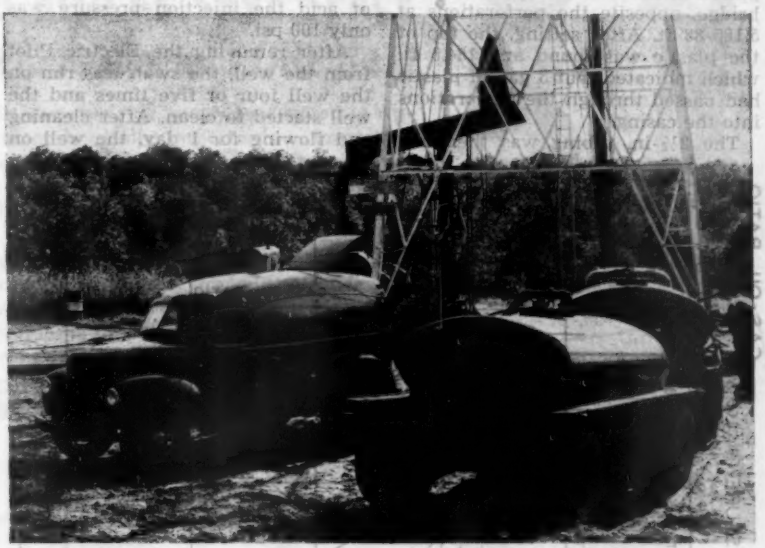
The example cited in this article is one where the combination of Electric Pilot methods with plastic-and-sand bridging made it possible to open up a second less-permeable, higher, and more productive zone than the more permeable lower pay, in which the original completion was made. By the plastic-and-sand bridging, it was possible to overcome the difficulties presented by incomplete sealing of the original cementing. The Electric Pilot methods made it possible accurately to locate and evaluate the zones of permeability of the formations in place.

The first part of this article will describe the recompletion methods applied by Dowell, Incorporated, under the supervision of O. W. Lyons, Shreveport district manager. In the second part of the article, reservoir and production data are presented, based on information prepared by Percy Irwin, engineer for Haynesville Operators Committee.

During the past several months, the method of recompleting wells producing from the Pettit lime in the Haynesville field indicates that a more uniform drainage of the producing zones in the Pettit formation can be obtained from producing wells. Injection wells can be improved by a more uniform distribution of the injection gas into the reservoir. Briefly, this method of recompletion consists of:

1. Electric Pilot determination of the location and magnitude of the permeability in place.
2. Use of sand to block out the part of the zone having the highest permeability.
3. Use of plastic-containing fillers to cap the sand and seal off between the pipe and the formation the section having the bulk of the permeability.
4. Use of the Electric Pilot to control the injection of acid into the tighter zone above the plastic bridge. (See Fig. 1).

A description of the workover of well No. 14-5 in the Haynesville Operators unit is typical of this type of recompletion and will illustrate the method employed. The 5½-in.



Acidizing trucks and Electric Pilot unit which controls selective acidizing

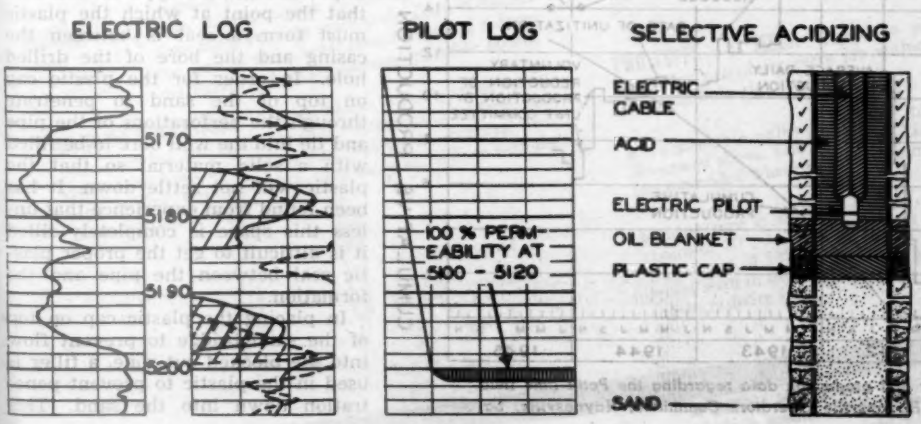


Fig. 1—Correlated electric log, Pilot log and diagram of selective acidizing of Well No. 14-5 in H. O. C. unit. Electric log indicates position of upper less-permeable zone selectively acidized during recompletion which has proved more productive than lower zone. Zone of 100 per cent permeability shown in Pilot log is regarded as coinciding with this lower more permeable zone despite measurement discrepancies

casing in this well was perforated with 198 shots evenly spaced from 5,166 to 5,199 ft. and acidized with 5,000 gal. upon completion in June 1942.

The electric log shows the presence of two productive sections in the zone perforated, one from 5,166-84 ft., the other from 5,191-99 ft. A permeability profile was made with a Dowell Electric Pilot and it was found that the acid used on completion had penetrated only the section from 5,197.5-99 ft.

A sand bridge was then placed in the well from the bottom of the hole, 5,254.5 ft., to 5,188.5 ft. This required 96 gal. of sand to fill 66 ft. of 5½-in. casing, indicating that approximately 66 gal. of the sand being used to fill opposite the permeable section from 5,197.5-99 ft. had passed through the perforations into a cavity behind the pipe.

The well was then perforated from 5,174-88 ft. in order to assure complete encirclement of the outside of the pipe with plastic. Seven gallons of plastic-containing fillers were placed in the well on top of the sand bridge, opposite the perforations at 5,185-88 ft. After setting, the top of the plastic was found at 5,184.5 ft. which indicated that 3 gal. of plastic had passed through the perforations into the casing.

The 2½-in. tubing was then run into the well with a standard A.P.I. 1 25/32-in. seating nipple on bottom at 5,178.5 ft. The Electric Pilot was run in the tubing and seated in the nipple with the interface electrodes located at 5,180 ft. The well was filled with oil and 3,000 gal. of inhibited acid pumped down the tubing and bled up the casing. Oil was pumped into the tubing to flush all of the acid in the annular space between the casing and the tubing.

When the acid was all spotted up the annulus and with the tubing full of oil, pumps were started on the casing and the tubing. The oil-injection rate in the tubing was adjusted to hold the acid up to 5,180 ft., maintaining an oil blanket on top of the plastic to prevent the acid from dissolving the lime around the plastic cap and penetrating the lower section blocked out with the sand. The Electric Pilot indicated no movement of acid below 5,180 ft. The casing pump injected the 3,000 gal. of inhibited acid spotted in the annulus into the zone from 5,174-80 ft. This section broke down at 1,225 psi. and at the end of the injection of acid the injection pressure was only 100 psi.

After removing the Electric Pilot from the well, the swab was run on the well four or five times and the well started to clean. After cleaning and flowing for 1 day, the well on a 4-hour test produced 99 bbl. oil and 102,000 cu. ft. of gas with a gas-oil ratio of 1,030 on a 32/64-in. choke.

Flowing on a 14/64-in. choke the daily production of the well tested as follows: Oil, 91 bbl.; gas, 207,000 cu. ft., and gas-oil ratio, 2,280.

Flowing on a 12/64-in. choke the daily production tested as follows: Oil, 48 bbl.; gas, 90,000 cu. ft., and gas-oil ratio, 1,880. The gas-oil ratio before workover was 3,097 to 1.

To date, nine wells have had permeability surveys. Of these wells, six have been selectively acidized to open up zones that had not been opened up on the initial acid treatment upon completion. In three of these wells the permeability surveys showed the upper portion of the sections to have sufficient permeability distribution to be used for gas-injection wells. Most of these workovers have been made for the purpose of opening up the upper producing section so that when used as gas-injection wells the gas would be evenly distributed in the uppermost portion of the reservoir.

Permeability surveys have been run on wells having from one to four indicated producing zones in the Pettit. However, these surveys have shown that only one zone has been acidized upon completion. In the zone acidized there may be one to three streaks of from 1 to 3 ft. in thickness that show effective permeability; the remainder of the zone and other zones showing zero effective permeability. This work indicates that much can be done to increase the production from the zones that have not been opened up with acid, by using methods of selectively blocking out the zones of high permeability and selectively acidizing the zones of low permeability.

The sand used in bridging over the permeable sections is a medium-sized round grain sand and due to its uniform grain size and roundness of particles, it will flow out through perforations and fill up any voids in the space between the casing and the bore of the well. This feature is important in this type of work in that the point at which the plastic must form a seal is between the casing and the bore of the drilled hole. In order for the plastic cap on top of the sand to penetrate through the perforations of the pipe and tie into the well bore to be filled with a solid material so that the plastic will not settle down. It has been found from experience that unless this space is completely filled it is difficult to get the proper plastic seal between the pipe and the formation.

In placing the plastic cap on top of the sand bridge to prevent flow into the blocked out zone, a filler is used in the plastic to prevent penetration down into the sand. This

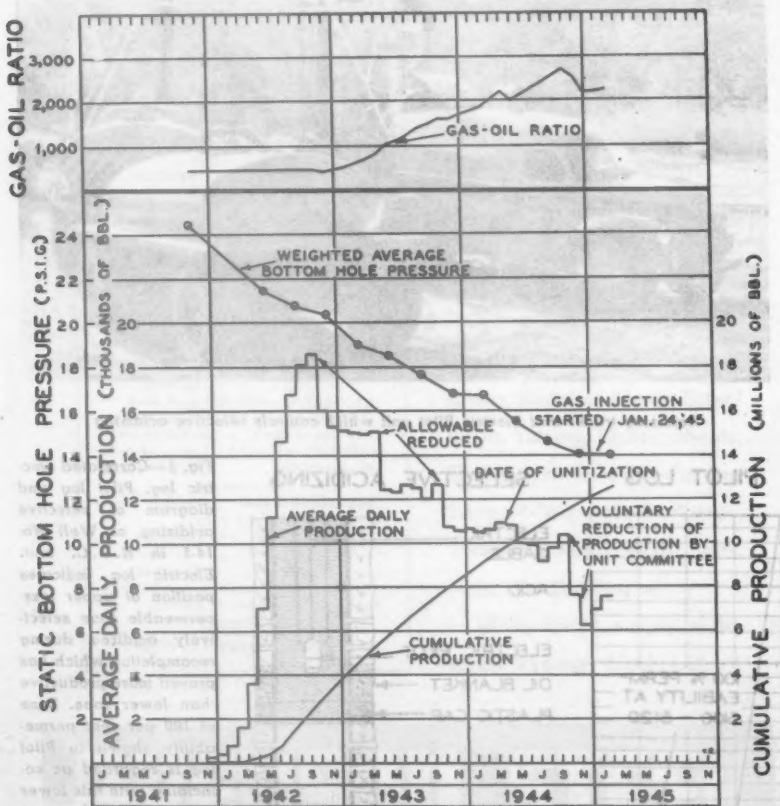

GAS-OIL RATIO
3,000
2,000
1,000
GAS-OIL RATIO
STATIC BOTTOM HOLE PRESSURE (P.S.I.G.)
AVERAGE DAILY PRODUCTION (THOUSANDS OF BBL.)
CUMULATIVE PRODUCTION (MILLIONS OF BBL.)
WEIGHTED AVERAGE BOTTOM HOLE PRESSURE
GAS INJECTION STARTED JAN. 24, '45
ALLOWABLE REDUCED
DATE OF UNITIZATION
AVERAGE DAILY PRODUCTION
VOLUNTARY REDUCTION OF PRODUCTION BY UNIT COMMITTEE
CUMULATIVE PRODUCTION
J M M J S N J M M J S N J M M J S N J M M J S N J M M J S N
1941
1942
1943
1944
1945

Fig. 2—Reservoir and production data regarding the Pettit lime field unitized by the Haynesville Operators Committee, Haynesville, La.

Baash-Ross News

BAASH-ROSS TOOL COMPANY · LOS ANGELES · HOUSTON · NEW YORK

OUR 25th YEAR

THERE'S NO ROOM FOR *This* ON PORTABLE RIGS!

Unitized Block with Link Adapter

Unitized Block with Hook

BAASH-ROSS UNITIZED BLOCKS SAVE SPACE by Combining Block and Connector into ONE Unit!

Because of the cramped quarters in portable rigs, every foot saved in rigging up the blocks and elevator equipment is vitally important . . . important because it permits running the pipe faster without risk of striking the crown, gives more working room at the floor to speed up crew operations, and frequently permits using longer pipe lengths which still further save time by requiring fewer connections per hundred feet of hole.

So why limit the efficiency of your portable rigs with the space wasting block-plus-hook arrangement of standard rigs when you can add extra feet of working height to your rigs with Baash-Ross Unitized Blocks? These Blocks are *especially engineered* to meet the requirements of portable rig operations and embody many unique features found in no other equipment . . .

MORE SPACE TOP AND BOTTOM

SAVE SPACE! By combining both the Block and Connector into ONE compact unit. Baash-Ross Unitized Blocks actually increase the working height of portable rigs by several feet. This extra room minimizes risk of hitting the crown. It gives more working space at the floor. It enables the crew to make faster round trips and reduces the hazards of close-quartered portable outfits!

SIMPLIFY OPERATIONS! Unitized Blocks not only speed up rig operations but also eliminate time wasted changing from one type of hook-up to another. ALL operations—running drill pipe, drilling, running tubing, rods, etc.—can be done with the *same* compact unit.

DRILLING

RUNNING PIPE

FREE-SWIVELING . . . OR LOCKED! The Connector is spring-loaded and swivels freely in a full 360° circle. Swivels as easily empty as loaded, eliminating twisted lines and wasted time. OR if free-swivel action is not wanted, Connector can be locked in any one of *four* different positions by simply throwing a built-in lock. Speeds up running pipe by holding elevators in fixed position for derrick man.

TWO TYPES—11 SIZES! There's a size and type Unitized Block for practically every job within the range of portable and slim-hole rigs . . .

▶ It's available either with *Link Adapter* or with *Hook*, as illustrated above. The Block with Link Adapter is particularly recommended where maximum compactness is desired.

▶ Either type is available in 1, 2, or 3 sheave models with choice of 20", 24" or 30" sheaves . . . and in 4 sheave models with choice of 30" or 36" sheaves. That's a selection of 11 different sizes in each of 2 types—22 different units in all, ranging in capacity from 30 to 150 tons!

A Bulletin is available describing the Baash-Ross Unitized Blocks in greater detail. Or see your nearby Baash-Ross representative for more data. Also page 279 of your Composite has helpful information on sizes and design.

sand has a relatively high permeability and since plastic is a true liquid it would penetrate readily into the sand. The purpose of fillers is to block the sand as the plastic starts to penetrate through, holding the plastic up on top of the sand. Sufficient penetration can be obtained into the formation above the sand, to get a complete tie-in with the formation.

The special type of dump bailer used in depositing sand in the well is constructed so that the sand will not bridge in the bailer and so that it will flow freely from the bottom as the bailer is raised. The plastic bailer is unloaded by means of a piston that displaces the plastic out of the bottom of the bailer when it sets on bottom. This method of dumping the plastic insures placement of the plastic on bottom without stringing it up and down the hole. In this type of work it is important to spot accurately the plastic since only a small part of the formation is to be used for the seal.

The methods of conducting the permeability surveys and the selective acidizing in this type of workover have been described in papers presented before the American Institute of Mining and Metallurgical Engineers: "Selective Acidizing and Permeability Determination by an Electrical Method," by Dana G. Hefley and P. E. Fitzgerald; "Applications of the Electric Pilot to Well Completions, Aciding and Production Problems in the Permean Basin," by P. J. Lehnhard and C. J. Cecil. Briefly the Electric Pilot method consists of determining the position and magnitude of flow of salt water from a column to various sections by observing an electrical contact with an oil-and-water-interface as it is lowered in the well by such flow.

As the Haynesville field was developed following its discovery in November 1941, practically all of the wells were acidized upon completion with from 3,000 to 10,000 gal. of acid depending upon the number of sections perforated. It was also indicated, at the time these wells were acidized that the acid was breaking down one zone and following the lines of least resistance into the zones opened first. To attempt selective acidizing of the separate zones, packers were set and the acid was introduced above and below them. In nearly every attempt to acidize by this method the acid circulated behind the pipe and entered the zone of least resistance. A permeability survey run on a well completed in this manner showed 98 per cent of permeability in the upper zone and 2 per cent in the lower zone; each zone having been acidized using the same volume of acid. A packer set in the pipe between the two zones definitely proved that there was communication behind the pipe. This work was done before the Electric Pilot was developed commercially and use could be made of it. One of the advantages of using the pilot for selective acidizing is that during the selective introduction of acid into one zone, the other zone is blocked out with oil and there is no differential pressure between the two zones to cause flow of fluid from one to the other.

General Outline of Development

In the discovery well of the Haynesville Pettit lime reservoir, the T. L. James et al 1 Aiken, 27-23n-8w, the top of the porous Pettit limestone was encountered at 5,411 ft.

In December 1941 completion of Ohio Oil Co. a/c 15G:W Taylor, (now a/c 4P No. 1 well) 15-23n-8w, furnished additional information regarding the probable size of the field. This well had originally been drilled to 11,270 ft. and after plugging back to 5,140 ft., the well was completed in the Pettit lime from 5,218-30 ft. after acidizing with 3,000 gal. During 1942, 128 wells were drilled to the Pettit lime and were completed as producers. In 1943, 29 producing wells were completed, and in 1944, 21 wells were completed as producers. Up to the present time, four wells have been completed in 1945.

Stratigraphy

The Pettit limestone lentils which make up the reservoir from which oil and gas are produced at Haynesville are typically composed of conquina limestone containing a small percentage of normal oolites. All components of the limestone, i.e. large shell fragments, small fossils and oolites, have been subjected to partial solution and from solution much calcium carbonate has been reprecipitated both concentrically on the particles and in a fine granular condition in the interstitial spaces, so that a fairly porous but relatively slightly permeable rock has resulted. Dolomite has not been identified.

Coregraphs of about a dozen Pettit wells have been prepared for operators in the field. The results indicate large percentage differences in porosity and permeability. The highest porosity measured is 29, the lowest, 10. The highest permeability recorded is 316 millidarcys from one small piece of core, while the lowest average for an edge well is 1.8 millidarcys. The arithmetical average of porosity measurements is 18; for permeability the average is 13.5 millidarcys or 42.2 millidarcys, dependent on whether the one measurement of 316 is discarded or included in the averaging. Connate water has been determined for four wells; its average for these determinations is 22.3.

Despite the fact that the original bottom-hole pressure in the field closely approached the calculated hydrostatic pressure for reservoir depth, no positively identified Pettit water has yet been produced in wells at Haynesville. It must therefore be assumed that no propulsive force is exerted on the fluid hydrocarbons by formation water. Two general zones of the porous section have been encountered in the Pettit lime zone, but both zones are not present in all the wells. The upper porous zone is generally much thicker than the lower and most of the wells have been perforated in both zones.

The present acreage underlain by the upper porous section is 13,925.7 acres with an average weighted net thickness of 12.56 ft. and a total productive reservoir volume of 174,907 acre-feet. The total acreage underlain by the lower porous section is 6,249.6 acres with an average weighted net thickness of 5.57 ft. and a total productive reservoir volume of 34,810 acre-feet.

Static Reservoir Pressure of Pettit Lime Zone

The static bottom-hole pressures and bottom-hole temperatures of the first two wells completed and producing from the Pettit lime reservoir are as follows:

1. The 1 T. L. James Aiken, the discovery well, had pressure of 2,190 psi. and a bottom-hole temperature of 188° F. at a depth of 5,430 ft. on November 26, 1941.

2. Ohio 15 Taylor had pressure of 2,329 psi. and temperature of 179° F. at a depth of 5,230 ft. on January 4, 1942.

Based on analysis of a bottom-hole sample of Ohio Oil Co. 15 G. W. Taylor, the original reservoir pressure of the Pettit lime was 2,440 psi. and the saturation pressure was 2,331 psi. An analysis of the bottom-hole sample of Navarro Oil Co. 4 Beene, in Columbia County, Arkansas, which was completed in and is producing from the lower porous section, indicated a saturation pressure of 1,338 lb. for the lower porous zone in this section of the field. On December 1, 1944, the weighted average reservoir pressure of the Pettit lime was 1,406.19 psi. Average weighted reservoir pressure on March 1, 1945, was 1,403.55 psi., after gas injection was started on January 24, 1945. The cumulative barrels of oil produced per pound pressure decline from original to December 1, 1944, was 11,517.

Production History

The peak production from the Haynesville Pettit lime zone was in October 1942, when the field produced 577,414 bbl. of oil or an average of 18,626 bbl. per day. Since that time, the daily allowable has been reduced four times to 15,000

bbl. in November 1942; to 12,000 bbl. in May 1943; to 10,000 bbl. in November 1943, and to 8,000 bbl. in June 1944. Since extension of production into Arkansas the allowable in that state has been based on the same acre-pound factor as used by the Louisiana Department of Conservation and reduction of daily allowable in Louisiana affected the daily allowable of the wells in Arkansas. In November and December, the unit voluntarily reduced production with the result that the average daily production of the field in December 1944, was 6,270 bbl. as compared with 10,357 bbl. in October 1944. The gas production was reduced to approximately 14,000,000 cu. ft. in December 1944, from 28,000,000 cu. ft. in October 1944. The cumulative production through February 1945 was 12,529,296 bbl. of oil and 16,054,422,000 cu. ft. of gas. The gas-oil ratio increased from approximately the amount of gas in solution per barrel of residual oil or approximately 475 cu. ft. per barrel to 2,238 cu. ft. per barrel by April 1944 In May, which was the first month after unitization, the average gas-oil ratio was 2.025 cu. ft. per barrel. During October 1944, when the average daily production of the field was 10,357 bbl. of oil and 28,000,000 cu. ft. of gas, the average gas-oil ratio was 2,730 cu. ft. per barrel. In December 1944, the average gas-oil ratio was reduced to 2,214 cu. ft. per barrel by the voluntary reduction of the unit production and for February 1945, was 2,287 cu. ft. per barrel.

Gas-Injection Volumes and Pressures

Gas injection was started on January 24, 1945, in one well, and by the end of the month, four wells were taking gas. A total of 32,737,000 cu. ft. was injected during January. During February, one additional gas-injection well was tied into the injection system and a total of 231,723,000 cu. ft. of gas was injected. During March 1945, 338,559,000 cu. ft. of gas was injected into five wells; one additional well being tied in and one well taken out of the injection system. The volumes of gas injected into the individual wells is as shown in Table 1.

The cumulative gas injection through March in all the wells was 603 million cubic feet. Individual well-injection pressures and volumes are approximately as shown in Table 2.

Average daily volume of gas being injected is 13,500,000 cu. ft. with approximately 2,000,000 cu. ft. per day being used for fuel for boilers and compressors.

Bibliography

"Selective Acidizing and Permeability Determination by an Electrical Method," by Dana G. Hefley and P. E. Fitzgerald (New York meeting, February 1943), American Institute of Mining and Metallurgical Engineers, Technical Publication No. 1604.

"Applications of the Electric Pilot to Well Completions, Acidizing and Production Problems in the Permian Basin," by P. J. Lehnhard and C. J. Cecil (Houston meeting, May 1944), American Institute of Mining and Metallurgical Engineers, Technical Publication, No. 1759.

TABLE 1

Ohio	1 Parker-Hilburn	(Coded Well No. 22-1)	6 million cubic feet
Blackwell	1 Waller-Sherman	(Coded Well No. 23-3)	15 million cubic feet
Arkansas	1 Waller-Taylor	(Coded Well No. 14-6)	107 million cubic feet
Ohio	1 J.T.&S.C. Waller U.P.	(Coded Well No. 14-8)	143 million cubic feet
Arkansas	9 Beene	(Coded Well No. 15-6)	158 million cubic feet
Ohio	1 J. L. Garrett a/c 5P	(Coded Well No. 23-1)	174 million cubic feet

TABLE 2

Ohio	1 Parker-Hilburn	(14-6)	2,100 lb.	1,000 M.c.f.
Ohio	1 J.T.&S.C. Waller U.P.	(14-8)	1,800 lb.	2,700 M.c.f.
Arkansas	9 Beene	(15-6)	1,860 lb.	5,000 M.c.f.
Ohio	1 J. L. Garret a/c 5P	(23-1)	2,050 lb.	1,700 M.c.f.
Arkansas	1 Waller-Sherman	(23-3)	2,100 lb.	3,000 M.c.f.

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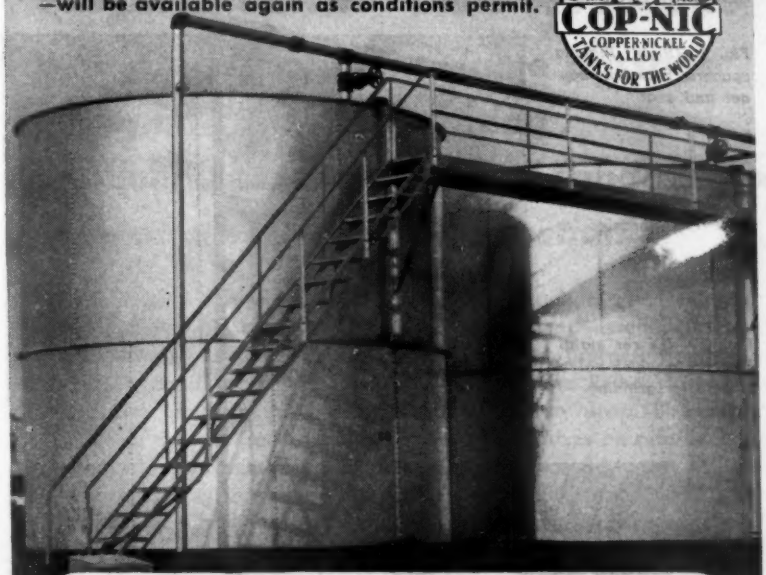

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Kansas City, Mo.

TANKS FOR THE WORLD

Use of Simple Fixture Saves Time In Reseating Small Globe Valves

A SIMPLE fixture for use in reseating 2-in. and smaller globe valves, shows as high as 75 per cent savings in repair time over ordinary methods. Made from pieces of discarded brass tubing or pipe or bushings, the fixture is placed in the valve's bonnet-stem subassembly as indicated in Fig. 1. After cutting the fixture to the dimensions given in the accompanying table, for different valve sizes, it is cut longitudinally to form two-ring or cylindrical sections. When placed around the valve stem between the bonnet and plug the sections serve as a lock, which prevents the bonnet from running free on the stem threads, and as a spacer which provides clearance between the body and bonnet when the disk is seated for grinding. In order to prevent the bonnet from working loose on the stem it should be tightened snugly against ring or cylindrical sections before starting grinding operations.

Fig. 2 illustrates the position of the fixture and the application of valve grinding compound to the disk. Fig. 3 indicates how the valve stem is rotated for the grinding operation. After the plug and seat are suitably ground, the fixture is removed, all parts thoroughly cleaned and the valve is reassembled for testing. If the valve passes the test for seat tightness it is placed in stock for eventual use.

This method for reseating small size globe valves was developed by Harold Davenport, a machinist for Skelly Oil Co.

	Length (in.)	I.D. (in.)	O.D. (in.)
2-in. valve	1⅛	⅞	1¼
1½-in. valve	23/32	⅞	1¼
1¼-in. valve	⅝	¾	1
1-in. valve	½	¾	1
¾-in. valve	½	⅝	⅞
½-in. valve	11/32	⅝	⅞
⅜-in. valve	½	½	⅝
¼-in. valve	9/32	⅝	½
⅛-in. valve	¼	⅜	½

Fig. 1—(Right) Placing spacers between bonnet and seat

Fig. 2 — (Lower left) Applying abrasive to seat.

Fig. 3 — (Lower right) Position in which valve is held for grinding

One of numerous gas processing plants designed and constructed by Petroleum Engineering, Inc., during its 16 years of service to the industry. *Petroleum Engineering, Inc. Offices: Tulsa and Houston.*

BOOKS

A.S.T.M. SPECIFICATIONS FOR STEEL PIPING MATERIALS. Published by American Society for Testing Materials, 260 South Broad Street, Philadelphia. 344 pp. $2.

This compilation of widely used standards provides those concerned with the production and use of steel piping materials with a handy and up-to-date file of the A.S.T.M. specifications covered in this field. Most of the specifications have been developed through the work of the society's Committee A-1 on steel. Emergency alternate provisions have been issued for many of the standards, and these are bound in the back of the publication.

REVIEW OF PETROLEUM GEOLOGY IN 1944. By F. M. Van Tuyl and W. S. Levings. Vol. 40, No. 2, of the Quarterly of Colorado School of Mines. 136 pp. $1.

This is the third annual review of oil geology by the authors, who are with the department of geology at the Colorado school. The subject matter includes news items and constructive developments in basic geology as well as in petroleum geology and borderline fields, as revealed by a search of the literature and the canvass of several leading workers in the petroleum industry. The most important contributions to the literature of more than general interest are digested. Other publications of more than local interest are listed in the 35-page bibliography. The review was compiled under sponsorship of the American Association of Petroleum Geologists.

Henry D. Noll, petroleum engineer, has been appointed manager of the project analysis department for Houdry Process Corp. Noll was formerly with the manufacturing department of Socony-Vacuum Oil Co., Inc., in New York just prior to joining Houdry.

C. M. Boren, L. H. Boren, and **M. D. Boren** have organized the Seminole Petroleum Corp., with headquarters in Seminole, Okla.

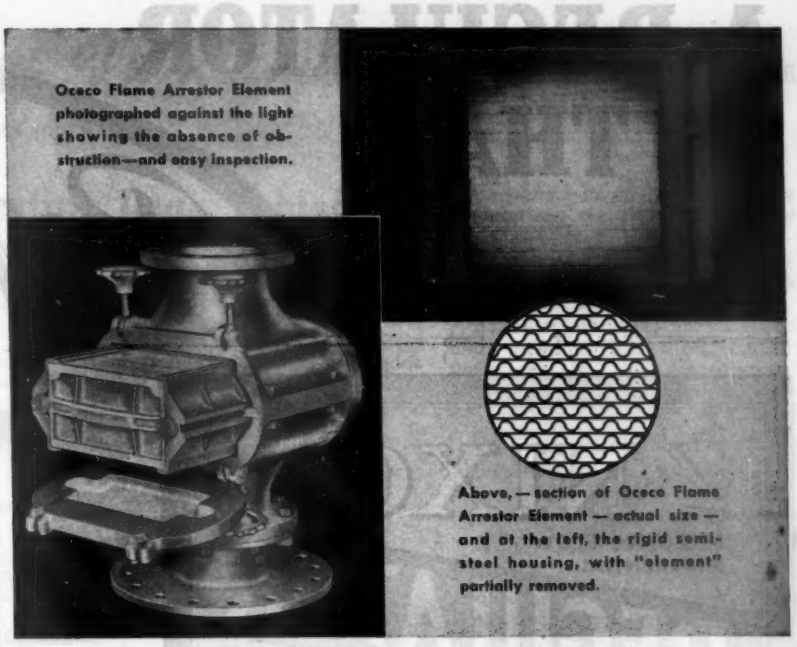
J. Al Brown, geologist formerly with Kentucky Natural Gas Co., has joined the Sohio Petroleum Co. staff at Owensboro, Ky.

Wilbur Griffith, formerly with the Gulf Refining Co. at Indianapolis, has opened an office at Mt. Vernon, Ill.

Ralph Esary has resigned as Indiana State Geologist to devote more time to his duties of chief geologist for the Indiana Farm Bureau Oil Co.

Rush D. Blodget, executive vice president of Oil Producers Agency of California, has been reelected for the fifteenth time since joining the agency in an executive capacity.

W. R. Watkins, Jr., Fort Worth, recently discharged after 2½ years of service in naval intelligence, has joined the Gulf Oil Corp.'s scouting department in the North Texas district with headquarters in Wichita Falls.


Oceco Flame Arrestor Element photographed against the light showing the absence of obstruction—and easy inspection.
Above,—section of Oceco Flame Arrestor Element — actual size — and at the left, the rigid semi-steel housing, with "element" partially removed.

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2. **Permit free tank venting**
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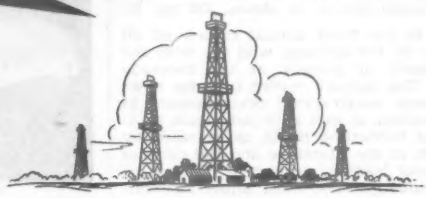

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(b) on high pressure separators as back pressure valves.

(c) on flow lines from gas wells which make fluid.

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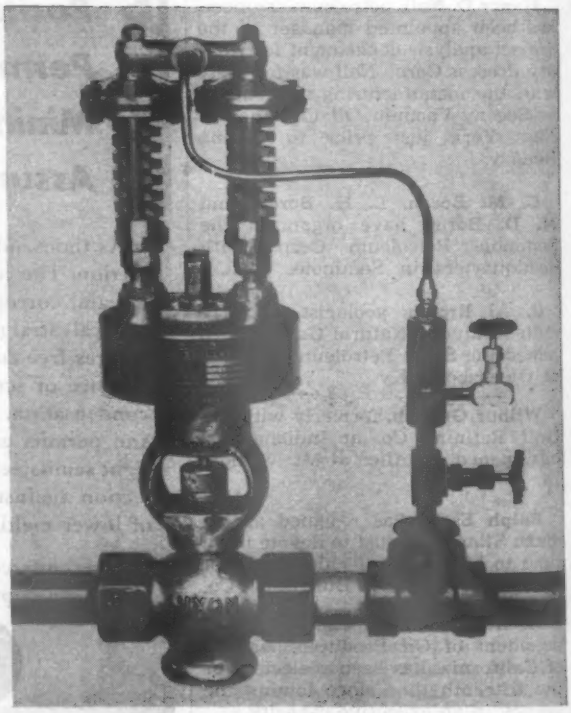

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Engineering Fundamentals

No. 186

A FEATURE OF THE OIL AND GAS JOURNAL

Method of Computing Gage Tables From Tank Measurements

Recording measurements. — The routine strappings of an oil-storage tank, according to the method outlined in No. 185 Engineering Fundamentals, may be recorded as shown in Table 1.

TABLE 1—FORM OF RECORDING TANK MEASUREMENTS

Height measurement (Fig. 1)*	Height above bottom (ft.-in.)	Circumference measurement (Fig. 1)*	Outside circumference (ft.)	Thickness of steel plate (in.)
H_1	2-6	1	85.38	$\frac{5}{16}$
H_2	4-6	2	87.85	$\frac{5}{16}$
H_3	6-6	3	79.53	$\frac{5}{16}$
H_4	8-6	4	80.83	$\frac{5}{16}$
H_5	10-6	5	82.36	$\frac{5}{16}$
H_6	12-6	6	83.59	$\frac{5}{16}$
Over-all height	14-6			

*See Fig. 1, No. 185 of Engineering Fundamentals. Gage tables are computed directly from these measurements.

Computation of gage tables.—The first step in preparing gage tables is to convert the outside circumference to inside circumference by subtracting the appropriate factor (see table for circumference correction factors in No. 185 of Engineering Fundamentals). For $\frac{5}{16}$-in. thickness, the factor is 0.1637 in. Next the volume is calculated for each ¼ in. of depth above the bottom of the tank by the following formula:

Volume per ¼ in. of depth = (inside cir. in ft.)^2 × 0.00029529.

The volume is the first ¼ in. of depth then (C_2 within height H_1)* = (87.85)^2 × 0.00029529 = 2.253 bbl.

The second ¼ in. = 4.506 bbl. and so on up to a height of 2 ft. 6 in.; then the new circumference (C_1 within height H_3 = 85.38) is used in the volume calculations up to 4 ft. 6 in., and so on until all (H_5) computations are complete. Then circumferences (within the height H_5) are used and calculations are continued in this way until the top of the tank is reached. Finally the volume of any deadwood measured in the tank is calculated per ¼ in. of height above the base and subtracted or added to the corresponding ¼-in. volumes. The figure is subtracted if the deadwood occupies space and added if the object measured adds volume to the tank.† The computations are then compiled into the tubular form of a gage table as shown in Table 2.

*See Fig. 1, No. 185 of Engineering Fundamentals.

TABLE 2—GAGE TABLE

Field ..... Wells ..... Size of tank ..... Strapped by .....
Lease ..... Company ..... Tank number ..... Date .....

In. 0 ft.		In. 1 ft.	In. 2 ft.	In. 3 ft.	In. 4 ft.
0		0	0	0	0
¼	2.253	¼	¼	¼	¼
½	4.506	½	½	½	½
¾	6.759	¾	¾	¾	¾
1	9.012	1	1	1	1
¼		¼	¼	¼	¼
½		½	½	½	½
¾		¾	¾	¾	¾
2		2	2	2	2
¼		¼	¼	¼	¼

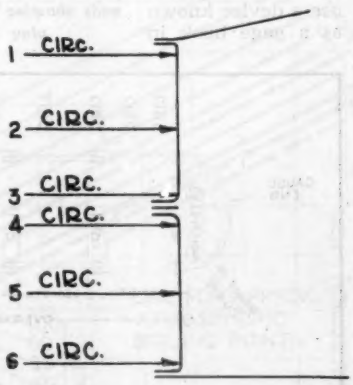


Fig. 1—Diagram of a bolted steel tank showing position of circumference measurements used in measuring volume of tank

†The method of measuring the volume and position of deadwood is discussed in the No. 185 of Engineering Fundamentals.

Variations in measurements and calculations for different type of tanks — Measurements and computations in Table 2 apply to the vertical, steel-riveted type tank (Fig. 1, No. 185).

Where other tanks are strapped and volumes computed, certain variations in the measurement technique are used. These methods‡ may be summarized as follows:

Vertical, steel-bolted tanks. — Measurements on this type of tank may be conveniently made in the order shown in the diagram, Fig. 1. The exact height of each strapping is marked with chalk and the height of each chalk line measured and recorded. In measuring large tanks of this type, ropes with rings or long wooden rods with rings in one end to hold the tape horizontally are most helpful.

Vertical, steel-riveted tanks with hemispherical ends.—Measurements on this tank are taken at each seam and at the top and bottom. Measurements are also made on the extension of the hemispherical ends and at other points as shown in diagram, Fig. 2. The extension of the hemispherical ends is measured on the inside of the tank if possible. The depth of the hemispherical ends is obtained by stretching a wire tightly across the diameter and taking the longest of several measurements as the depth. The extensions and laps should end and the depth of the hemisphere begin at the point of curve of the hemisphere, Fig. 3. The depth of the top hemisphere is taken from the outside, as shown in Fig. 3. The top depths are taken by using a 2-ft. level, if on the outside, or, if on the inside, by drawing a wire or string tightly across the exact center and measuring from the

‡Directions condensed from "Instructions for Measuring Tanks" compiled by the Shell Development Co.

Series prepared by F. B. Plummer, professor, petroleum engineering school, University of Texas

center of the wire. Measurement A (Fig. 3) is taken at midpoint of the hemisphere, and B and C are averaged; then subtracting A from the average measurement gives the correct depth. The lowest point in the bottom of the tanks, recorded as 0 ft.-0 in., is taken as the reference point for all vertical heights in the calculations and tables. All laps and thicknesses of metal are carefully measured.

Prostrate, steel-riveted or welded tanks with hemispherical ends.—This type of tank is mostly used for refined and casinghead gasoline storage. The circumference, length of ring extension, and over-all lengths are measured at places shown in Fig. 4. The extension of each end is determined by estimating the point of curvature at the hemisphere. The depth of the hemisphere is taken with a plumb bob, Fig. 4. In most places in the field the tank is closed, making it impossible to get inside for measurements. The thickness of hemispherical end plates, therefore, have to be taken from the manufacturer's specifications, and curvature points estimated from outside measurements.

Kinds of gage tables and their application.—Gage tables for these different types of oil tanks are compiled exactly the same as the one described above for the riveted tank except for prostrate tanks. Two kinds of gage tables are in use, however, inage tables and outage tables. Inage tables are used when measuring oil during the filling of tanks and outage tables during the emptying of tanks. In measuring oil during the filling of a tank, a steel tape with a heavy plumb bob attached to the lower end is used in most places to measure the depth of fluid. The tape and bob are lowered until the bob just touches the bottom of the tank and are then carefully withdrawn without agitating the oil. Oil clings to the tape and leaves a mark from which the exact depth of fluid in the tank can be easily read. In measuring oil during the filling of tanks and in using the outage tables, all measurements are made from a plain mark or "knife edge" established on the gage plate at the roof level of the gage hatch to which all measurements are referred. The distance between the gage plate line and top of the oil in the tank is measured, then the oil is drawn off, and the new distance between the gage plate line and remaining oil in the tank is determined. The difference between the two measurements represents the height of the oil column removed. Using this figure, the volume of oil drawn out is read from the outage gage table. In making measurements of the position of oil surfaces for use with outage tables, some gagers use a device known as a gage hook in place of the plumb bob. The hook is sunk beneath the oil surface and then carefully raised. It is easy to notice precisely when the point of the hook emerges at the oil surface, and the depth of this point below the gage line is recorded by the gager. The point of the hook is the zero point of the tape.

For more details on the strapping of tanks and measurements of oil volumes the reader is referred to code No. 25 for measuring, sampling, and testing crude oil, published by American Petroleum Institute.

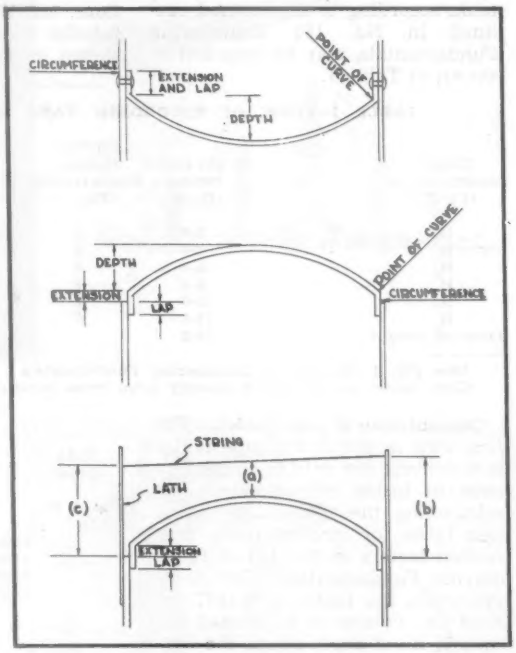


Fig. 3—Diagram of a riveted steel tank with hemispherical ends showing position of measurements taken when strapping the hemispherical ends of the tank

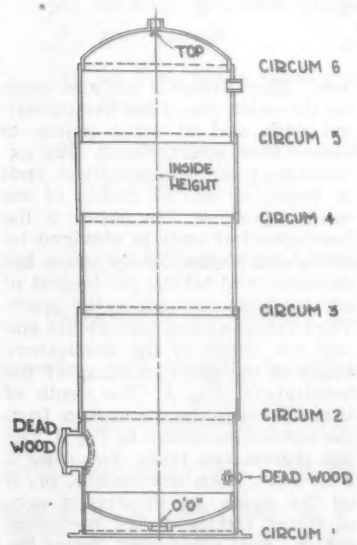


Fig. 2—Diagram of a riveted, vertical steel tank with hemispherical ends showing position of circumference measurements

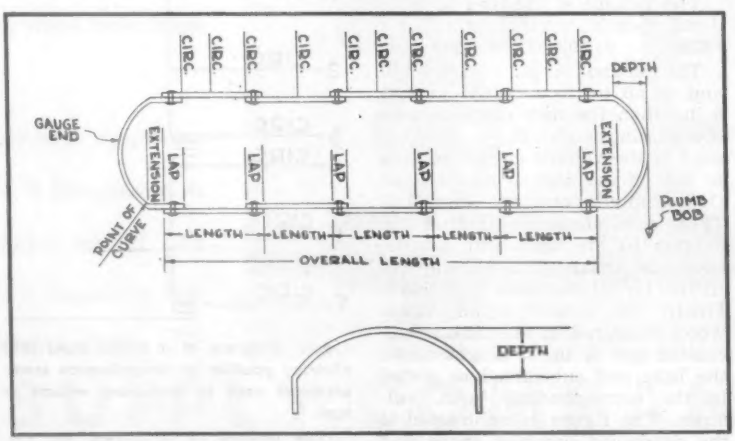
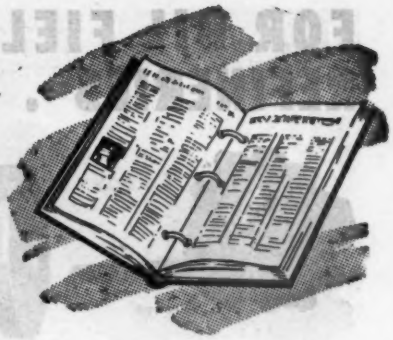


Fig. 4—Prostrate, riveted steel tank with hemispherical ends, showing position of measurements taken when strapping the tank. (All illustrations after "Instructions for Measuring Tanks." Shell Development Co.)

The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL



Heating Oil Vapors

THE specific heat of oil vapors (see The Refiner's Notebook No. 40 for liquids) is somewhat lower than for liquids. The dotted lines above 700° F. indicate that oils (or vapors) cannot be heated to such temperatures without undergoing thermal decomposition and hence the specific heat shown is inaccurate unless the time of heating is very short. The dotted lines in lower regions of Fig. 1 indicate that the vapor condenses to a liquid unless the pressure is below atmospheric pressure, i.e., a vacuum. The words "gas specific gravity" that are used for the upper part of the diagram means the ratio of the weight (or mol weight) of the gas to that of air. The lower lines are marked A.P.I. gravity and this refers to the A.P.I. gravities of the liquids from which these vapors were derived.

See The Refiner's Notebook No. 40 for an example of how to use specific heat. Characterization factor is also mentioned there. The average heat required to raise the temperature of vapor through 1° is about 3.5 B.t.u. per gallon (of liquid in vapor state) and for typical gases such as methane and natural gas the value is about 2 B.t.u. per gallon. These values range widely, from 1.5 B.t.u. for methane gas at low temperatures to about 5 B.t.u. for gas-oil vapors at high temperatures. Vapors are usually handled at a temperature close to their atmospheric condensing temperature, i.e., close to the boiling-point line on the figure, but they can be superheated to the temperature range shown in the upper part of the figure.

Pressure or vacuum affects the specific heat or heat content of gases or vapors to an important extent but the computations are so complicated that they cannot be given here. (Refer to Watson and Nelson, The Oil and Gas Journal, page 34, July 2, 1936, or Hougan and Watson, Industrial Chemical Calculations, 2nd Ed. John Wiley & Sons, New York, 1936.)

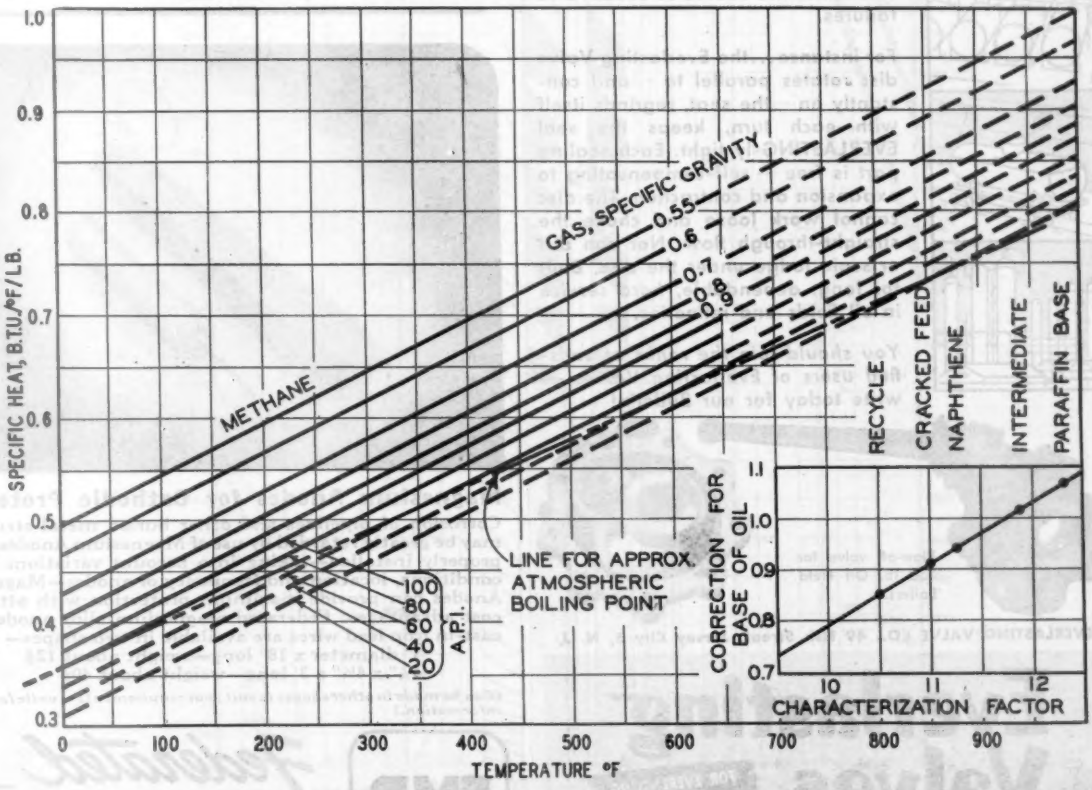
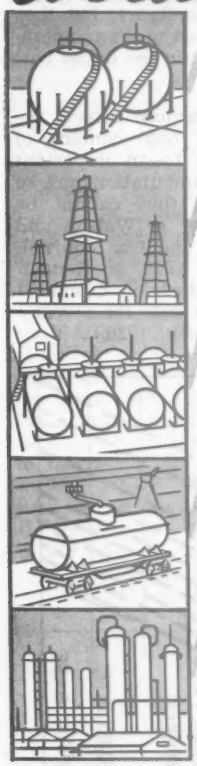


Fig. 1—Specific heat of Mid-Continent oil vapors at atmospheric pressure

No. 42 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

FOR OIL FIELDS AND REFINERIES . . . IT'S

Everlasting VALVES



In oil fields and refineries, Everlasting Valves are serving on: drilling boilers; blow-off lines; emergency throttle service on drilling engines; gasoline and oil loading racks; storage and measuring tanks; spray lines; . . . everywhere that *quick action*, full opening and drop-tight closing are vital.

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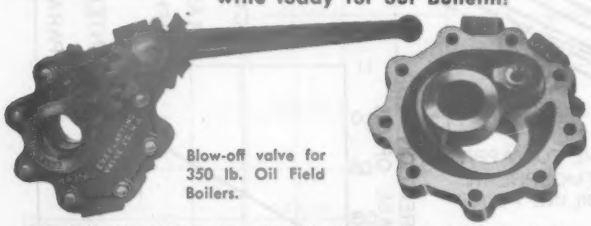

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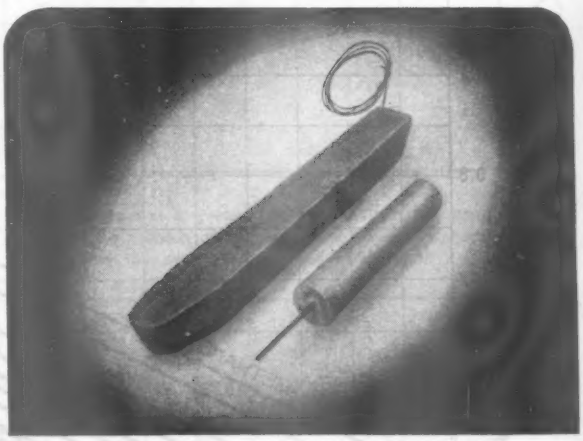

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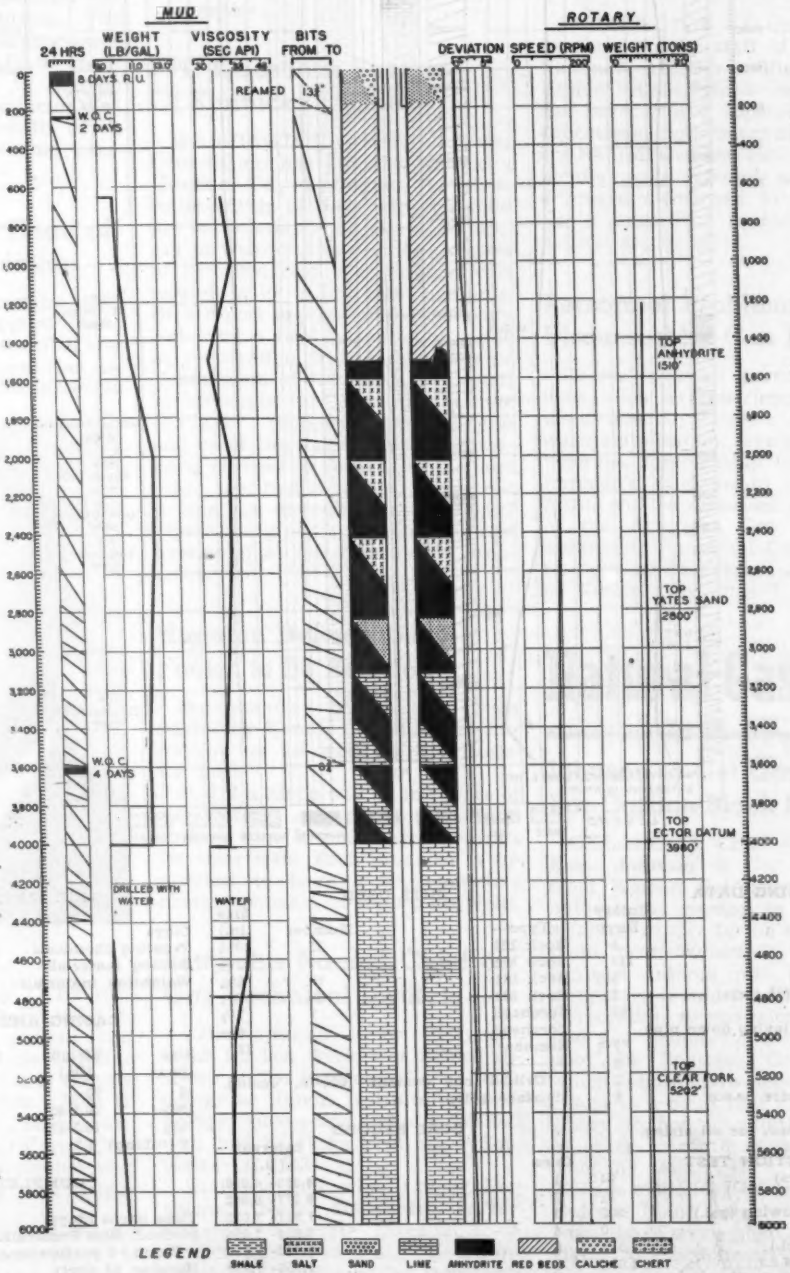
Journalog
A FEATURE OF THE OIL AND GAS JOURNAL

Discovery Well, TXL Field, Ector County, Texas

SHELL OIL CO., INC., 1 TXL
667.3 ft. from EL and 664.4 ft. from SL, Sec. 7, T & P Survey, Block 45. Elevation 3,339 ft.

CONTRACTOR
Loffland Brothers Co.



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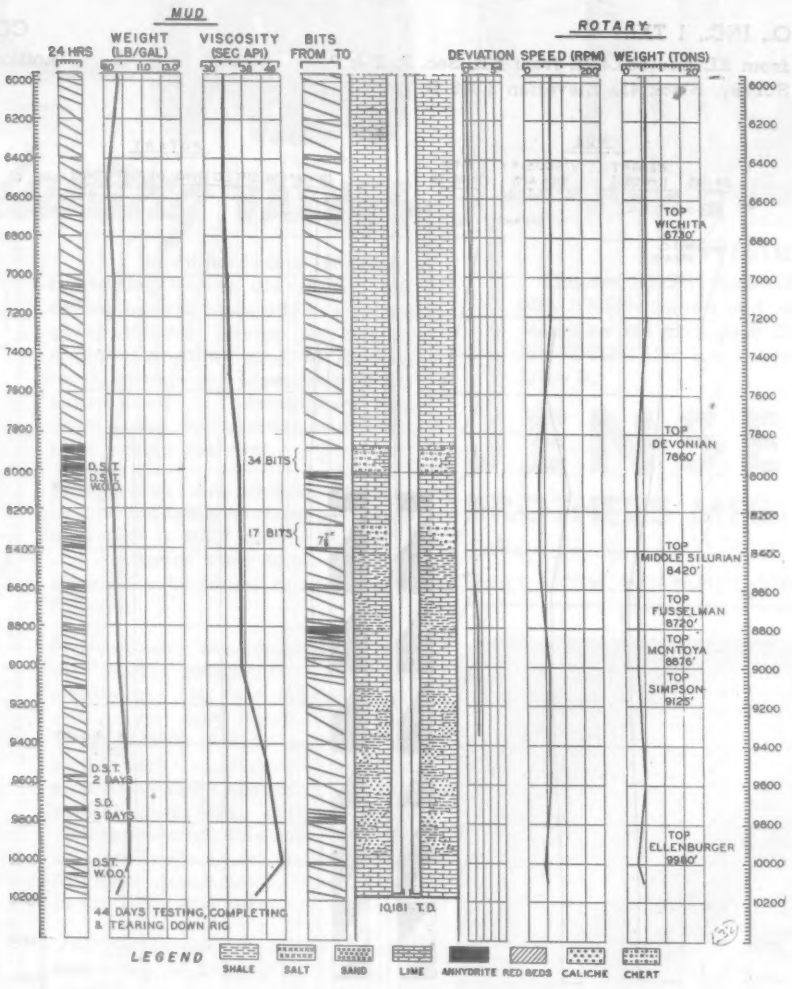
Discovery Well, TXL Field, Ector County, Texas (Continued)



DRILLING DATA

Type of rig	Rotary
Time record:	Days
Rigging up	8
Drilling	112
Coring (8 cores)	3½
Drill-stem tests (21 tests)	2
Trips	53
Running casing, laying down pipe and w.o.c.	*7½
Milling on junk	2
Reaming	2
Shut down, repairs, w.o.c.	8

*Exclusive of w.o.c. for oil string.

PRODUCTION TEST

Time flowed (hours)	24
Size choke (in.)	½
Tubing pressure flowing (psi.)	500
Casing pressure	0
Oil production (bbl.)	1,911
Gas production (M.c.f.)	1,668
Gas-oil ratio (cu. ft./bbl.)	873
Gravity oil (A.P.I.)	41

BITS USED

Type—	Number	Size (in.)
Rock bit	15	13¾
Rock bit	1	*9⅞
Rock bit	56	8¾
Rock bit	59	7⅞
Corehead	7	7½
Corehead	1	6¾
Reamer†	1	22

*Drilled out cement 10¾-in. casing.
†Surface hole.

CORE RECORD

Core	Interval (ft.)
1	4,393- 4,398
2	6,377- 6,392
3	7,017- 7,035
4	7,053- 7,064
5	7,084- 7,082
6	7,936- 7,938
7	9,730- 9,748
8	10,003-10,019

MUD MATERIALS

	Lb.
Clays	142,600
Treating chemicals	104,070
Sealing materials	24,200
Weighting materials	117,300

CASING AND TUBING

Size (in.)	Weight (lb.)	Depth (ft.)	Cement (sacks)
16	70	211	250
10¾	40.5-45	3,599	3,500
5½	15.5-17	8,995	1,440
2 (tubing)	4.7	8,017	Hung

COMPLETION

Time spent (days)	44
Method: Gun Perforation	
Depth of perforations (ft.)	7,886-8-020
Number of shots	536
Size shots (in.)	½
Acidizing (gal.)	1,000

Natural Gas

American Gas Association To Intensify Research

Research is an important factor in the plans of the gas industry for meeting postwar conditions. The American Gas Association announces that nearly $2,000,000 will be spent over the next 3 years to develop improved methods of producing and utilizing gas for the benefit of its 20,000,000 customers in home, commerce and industry.

J. H. Dunn Chosen Head of Natural Gas Association

DALLAS.—J. H. Dunn, vice president and general manager of Shamrock Oil & Gas Corp., Amarillo, was elected president of Natural Gas Association of America at the directors' meeting held here May 2. He succeeds J. H. Vaiden, Skelly Oil Co., Tulsa. Vice presidents chosen: Paul M. Raigorodsky, Glen Rose Gasoline Co., Tulsa; H. A. Ells, Cities Service Oil Co., Bartlesville, Okla.; John B. Atkins, The Parade Co., Shreveport. C. R. Williams, Chicago Corp., Corpus Christi, Tex., was elected vice president representing the High-Pressure Gas Division.

J. H. DUNN

Dunn, who received a B. S. in mechanical engineering from Texas A. & M. College, joined Lone Star Gas Co. as an orifice meter inspector in 1926. He was chief production engineer for that company when he assumed his present post with Shamrock in 1939. He is a vice president of Independent Natural Gas Association of America, which he helped to organize.

FPC Questions Excesses Of Kentucky Utilities

WASHINGTON. — Federal Power Commission has directed Kentucky Utilities Co., Lexington, to show cause within 60 days why it should not be ordered to dispose of $6,556,514 in write-ups and other excesses of recorded cost over original cost carried in its utility plant accounts. In a report served on the company following a field examination made in cooperation with Public Service Commission of Kentucky, FPC staff recommends: (1) Company eliminate $1,679,607 representing write-ups and other improper items by immediate charges to earned surplus and other specified accounts; (2) submit a plan for disposition of $4,876,907 representing excess of purchase cost over original cost of acquired properties.

Hugoton Deliverability Factor to Be Retested

Deliverability retests have been started by Kansas Corporation Commission on all wells in the Hugoton pool.

R. J. Phillippe will be in charge of the testing, and producers should contact him to make arrangements for their tests. Each producer is requested to have a representative present to assist in testing his wells.

Pettyjohn Named Chief of Gas Technical Institute

Comdr. Elmer Shaw Pettyjohn, U.S.N.R., last week was named director of the Institute of Gas Technology at Illinois Institute of Technology, succeeding John I. Yellott who has held the post since September 1, 1943.

Until the time when Comdr. Pettyjohn's naval assignment is terminated, Associate Director L. J. Willien will be in charge, according to the announcement by Dr. Henry T. Heald, president of Illinois Tech and the Institute of Gas Technology.

Comdr. Pettyjohn is at present absent from the country as head of the oil section of the United States Strategic Bombing Survey and as liaison in the United States Naval Technical Mission.

Yellott will leave the gas institute on May 1 to become director of research with the Locomotive Development Committee of Baltimore, Md.

Whyte Goes to Educational Department of I. N. G. A.

WASHINGTON.—Louis E. Whyte, formerly on the staff of Bureau of National Affairs, affiliate of the United States News organization, has been named supervisor of the educational department of Independent Natural Gas Association. He will handle news releases and develop a program designed to inform the public regarding problems of the natural-gas industry.

Personnel Problems to Be Discussed by Gas Men

Critical over-all personnel problems, such as experience with revised selective-service regulations, wage stabilization, reemployment of veterans, foremanship training, and foremen's relationship to management, will be discussed at meetings of the American Gas Association Southwest Personnel Conference to be held in Shreveport June 5 and at Kansas City June 7.

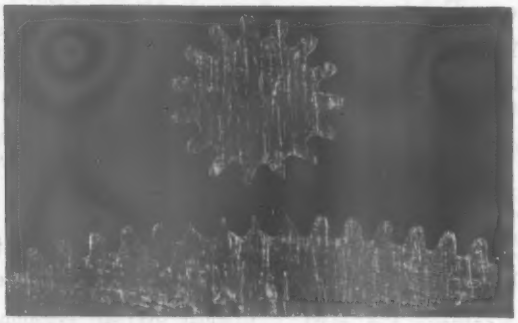
Natural Gasoline

Johnson to Get Gas Needed For Carbon-Black Plant

OKLAHOMA CITY.—Charles Eneu Johnson & Co. will obtain from Warren Petroleum Corp. the natural gas needed to supplement a failing supply for its carbon-black plant near Stonewall, Okla., if a contract entered into by the two companies is approved by the State Corporation Commission. The residue gas obtainable from the Fitts pool, in Pontotoc County, upon which Johnson now depends, has declined to a point that makes it necessary to get an additional supply in order to continue operation, the company says.

Plans made look to construction by Defense Plant Corp. of a pipe line from the Warren plant near Madill, Okla., to the Johnson carbon-black plant and movement of 8,000,000 cu. ft. of residue gas daily for manufacture of carbon black.

HOW ARE YOUR TEETH WEARING?



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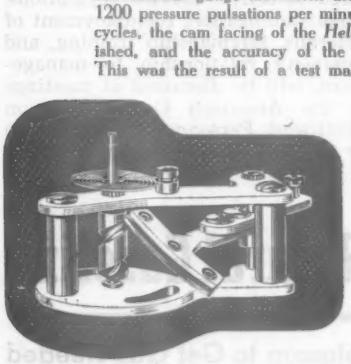

Only Certified Gauges are made with the Helicoid movement. This means there are no teeth to wear out or get sticky. The smooth rolling action of the Bakelite cam against the hard bronze roller practically eliminates wear.

HAVE you looked at the gear teeth in your pressure gauges lately? Are they so worn that your gauges are inaccurate and unreliable? If so, better replace with Certified Gauges to eliminate gear teeth trouble.

All Certified Gauges are guaranteed accurate to within ½ of 1%. They stay accurate longer. They are ideal for pumps, compressors, presses, turbines, etc. Send for catalog.

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REFINING

OPA Modifies Ban on Use Of Fuel Oil on Highways

WASHINGTON.—At the request of Petroleum Administration for War, the ban on issuance of rations for fuel oil to be used in surfacing or maintaining roads or as a dust palliative has been modified by Office of Price Administration. OPA's action, effective May 8, conforms with recent PAW directives permitting manufacture of five grades of slow-curing road oil.

Use of fuel oil on highways will be authorized, except in Washington and Oregon, which are excluded by the PAW directive, under the following conditions:

1. The fuel oil used for these purposes must be slow-curing road oil Nos. 1, 2, 3, 4, or 5.

2. The applicant must be a federal or state agency, a political subdivision of a state government, or a contractor maintaining or constructing a road for one of the eligible agencies.

Use of a fuel oil ration for road surfacing other than the ration specified (slow-curing road oil to be used in the production of paving material or dust palliatives) is still prohibited unless PAW has granted the applicant an exception, OPA said. However, PAW approval is not required for the issuance and use of rations for slow-curing road oil.

OPA explained that road oils in general are classified as fuel oils and are rationed, but heavy asphalts are not included under the definition and are not rationed. Slow-curing road oil is heavier than oil used for heating purposes and its use will not affect the nation's limited supply of heating oil, the agency added.

Gulf Coast Gasoline Stocks Headed for Lower Levels

HOUSTON.—Stocks of all grades of gasoline and naphthas continued their movement to lower levels during the second half of April. They were reported at 1,339,953 bbl., a drop of 24,353. Automotive gasoline stocks were 483,139 bbl., an increase of 60,563.

Total stocks of all products were 2,860,629 bbl., a decrease of 145,767. A year ago the total was 3,182,692. Crude runs totaled 135,432 bbl. daily.

Fluid Catalyst Principle to Extend to Many Processes

The Fluid catalyst principle now employed in catalytic cracking of petroleum will be applied to many other chemical processes, prophesied H. P. Wickham, M. W. Kellogg Co. process engineer, before the Metropolitan Section of the American Society of Mechanical Engineers here recently. Utilization of this finely divided catalyst idea, in which the catalyst principle has an average diameter of 50 microns but in which many particles, up to 40 per cent, have diameters below 20 microns, simplifies many types of operations, Wickham said.

This finely divided catalyst takes on the flow characteristics of a fluid when mixed with a gas or vapor, facilitating handling as well as eliminating much of the difficulty of catalyst manufacture, since exact particle size and shape is not mandatory, he indicated. "It is significant that variations in density, roughness and hardness are allowable," he observed, stating, however, that fragile material which continuously breaks down into smaller particles is not desirable. Equipment employed must be able to withstand the high temperatures of chemical reactions such as cracking, must not erode too rapidly, and means for controlling the amount of catalyst

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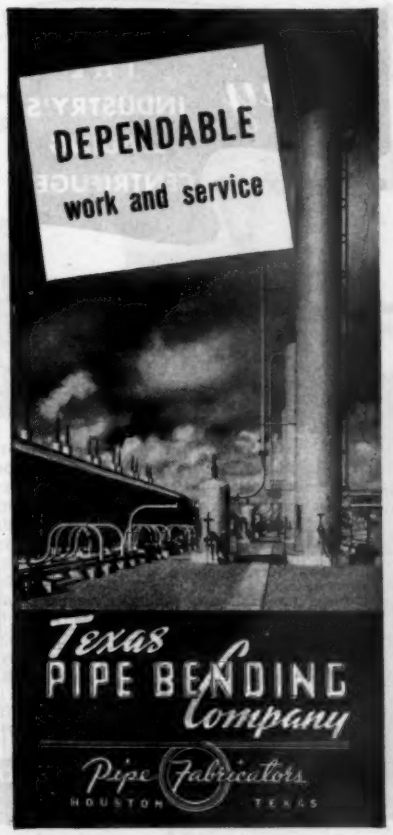

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present must be provided. One new cracking unit has operated on synthetic catalyst for 300 days without interruption, he stated.

Speed Urged in Moving Kerosene, Heating Oil

WASHINGTON. — The Petroleum Administration for War is urging that every effort be made to speed the movement of kerosene and home-heating oil from original suppliers to secondary suppliers and consumers as a step toward forestalling a possible serious shortage of these products next winter.

Should storage facilities of primary suppliers become overloaded some refineries will have to reduce their distillate and kerosene yields, PAW continued, thereby creating a production loss that cannot be made up and that present high requirements for all petroleum products cannot stand. The result will be a shortage of home-heating oil and kerosene during the next heating season, the extent of which will depend on the number of refineries that have to slow down for lack of outlets.

Plan for Replacement of War Distillate Offered

CHICAGO. — Two committees of District 2 (Middle West), Petroleum Administration for War, have approved a plan designed to remove inequalities in supplying replacement products to support the district's military quota of 50,000 bbl. daily of light fuel oil. The existing plan, it is said, would leave some refiners of District 2 with inadequate supplies of distillate. Conforming to the recommendation of the district's supply and transportation committee and distribution committee, PAW has agreed to:

1. Withhold shipments from District 2 into District 1 (East Coast).

2. Import distillate into District 2 from District 3 (Gulf and Southwest) that normally would move into District 1.

The recommendation was made to distribute these supplies fairly. It follows:

"When a company desires the assistance of PAW to obtain supplies of distillate in order to meet essential civilian commitments in District 2, it is recommended jointly by the supply and transportation and the distribution and marketing committees for District 2 that the director of supply and transportation for District 2 will attempt to arrange new supplies of distillates in an amount not to exceed the company's average pro rata share or contribution of the military distillate requirements."

It does not prevent a company from subsequently asking PAW for additional distillate supplies required to meet its civilian demand.

This does not change the military distillate replacement plan, it is stated.

A meeting of a special committee was held here last week to discuss reimbursement to companies for excessive costs caused by obtaining distillates from abnormal sources.

The kerosene and distillates supplied to District 2 will meet minimum specifications required under provisions of Petroleum Directive 159.

Sketches of Plant Operators

WILLIAM R. ARGYLE, of Swarthmore, Pa., who resigned as associate director of the refining division, Petroleum Administration for War, has returned to his former post as assistant manager of refining for Sinclair Refining Co., with headquarters in New York. He was drafted by PAW in September 1943 to serve as assistant director of its refining division and was advanced later to associate director.

From the time he assumed office, Argyle was directly concerned with the operations of all United States refineries, both from the standpoint of crude runs and production.

Argyle was born in Spanish Fork, Utah, and is a graduate of the University of Utah. From 1918 to 1920 he was employed as a physicist by the Bureau of Mines. He became associated with the Sinclair Refining Co. in 1920.

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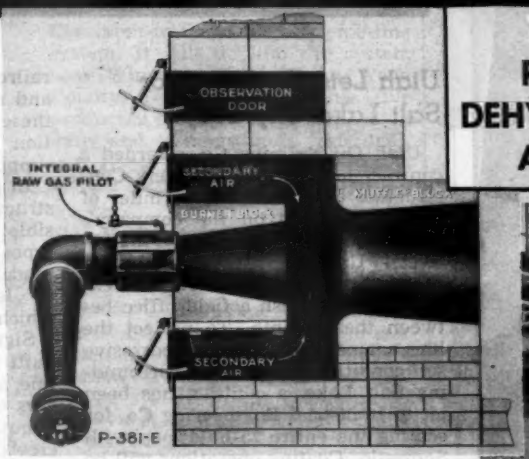
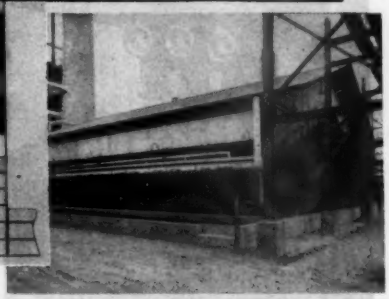
TANDEM COMBUSTION UNITS

HOUDRY FLUID THERMAL CRACKING

TOPPING REFORMING DEHYDROGENATION ALKYLATION





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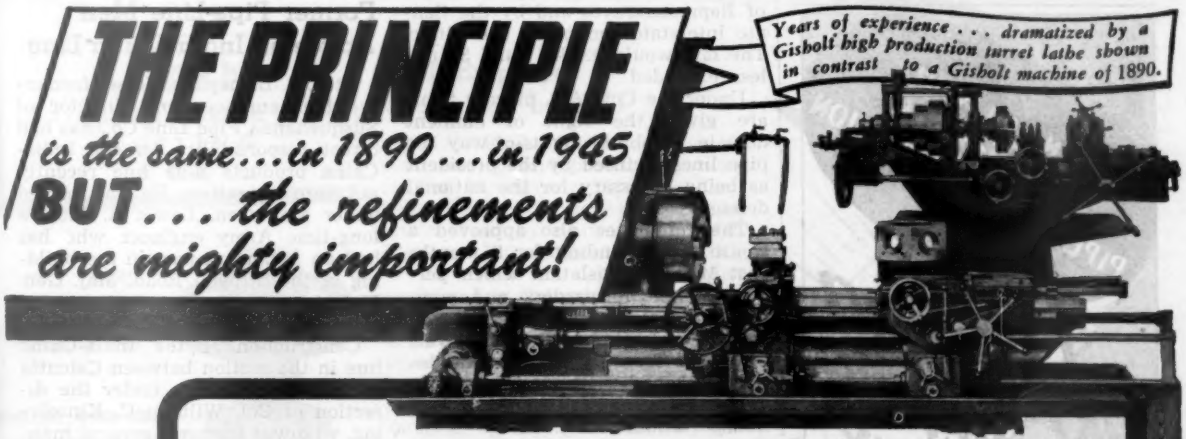
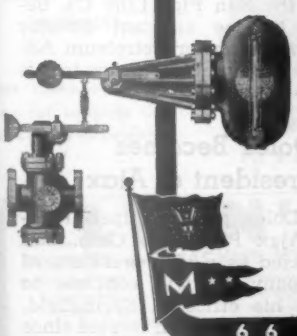
THE PRINCIPLE

is the same... in 1890... in 1945

BUT... the refinements are mighty important!

Years of experience . . . dramatized by a Gisholt high production turret lathe shown in contrast to a Gisholt machine of 1890.





There's little difference in principle between the "belt driven screw machine" of 55 years ago and the ultra-modern Gisholt turret lathe of today. *But in practice* . . . ah! . . . 7 to 10 times the production per man-hour . . . heavier feeds . . . smoother cuts . . . more accurate work! Better machining with such greatly improved machines is partly the answer to the dependable efficiency of Kieley & Mueller Controls . . . but *experience* must get most of the credit. For Kieley & Mueller experience, like Gisholt's, inspires steady progress in design, production and performance. Type 250 Liquid Level Control is a typical example. For maintaining constant levels in open or closed vessels, there is no device more sensitive. The "pack-ezy" ball bearing stuffing box minimizes friction, is tight under pressure or vacuum, and may be repacked in the field with ordinary tools. Value bodies have large open port areas, and removable and renewable seat rings. Sizes ½" to 6" with self-contained float cage. Yes, the principle of today's Kieley & Mueller Liquid Level Control is unchanged . . . *but the refinements are mighty important!* Write for Catalog No. 66.

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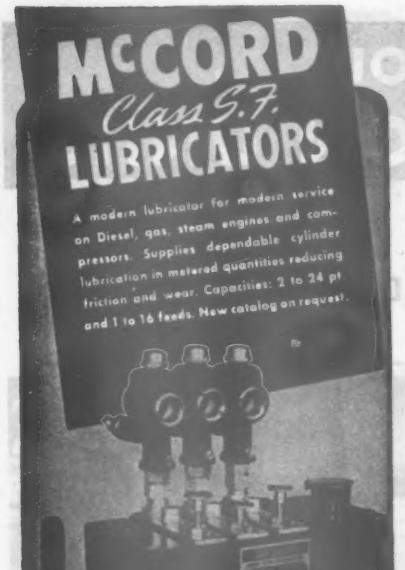
66 YEARS OF CONTROL PROGRESS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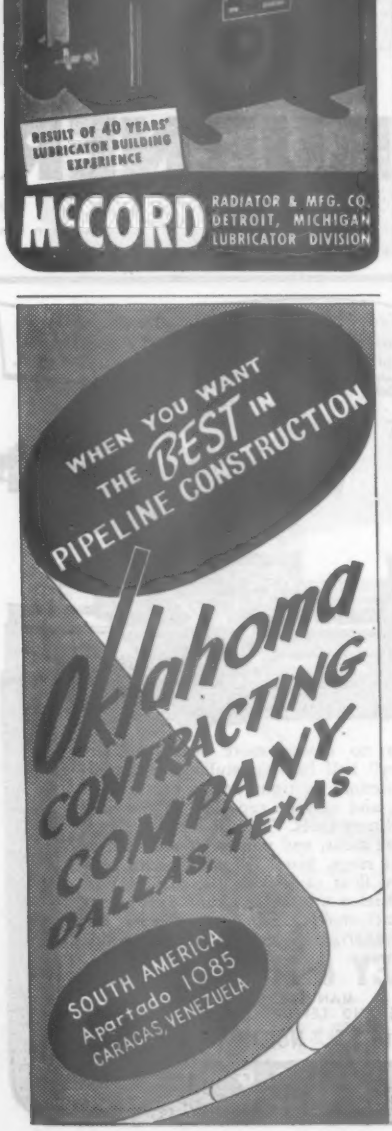

PIPE LINES

Utah Lets Contracts for Salt Lake City Loops

Utah Oil Refining Co. awarded a contract to Anderson Brothers Construction Co. for laying 25 miles of 8-in. for a loop on the company's main line to parallel the 6-in. between Uintah Junction and Salt Lake City. The contractor is expected to establish a field office between these points. To protect the line against the effects of corrosive soil conditions in the area surrounding Salt Lake, a contract has been let to Industrial Engineering Co. for coating the entire 25-mile loop with Somastic. Coating operations will be carried on in a yard to be located at Kayville, Utah.

Cole Bill Extension Is Approved by House

WASHINGTON. — A 1-year extension of the Cole pipe-line law of 1941 was approved by the House of Representatives and by the Senate interstate commerce committee. The law would expire June 30 unless extended.

Under the Cole Act, private firms are given the right of eminent domain to obtain rights-of-way for pipe lines certified by the president as being necessary for the national defense.

The committee also approved a House bill extending for 9 months past May 16 legislation which permits freight forwarders and common carriers by motor vehicles to operate under joint rates. The War, Navy and Treasury departments declared that discontinuation of the joint rates next week would disrupt transportation.

China Line Laid Under Combat Conditions

The recently completed invasion type India-China pipe line of 4-in. and 6-in. pipe was laid under hazardous conditions by the American Army and Chinese and Indian labor.

Troops were halted many times in the construction by Jap snipers. At such times they became combat troops and killed Japs as they went, laying pipe on the heels of the retreating enemy. Pipe and personnel and supplies were transported by railroads, barge lines, river boats, and make-shift rafts. When none of these was adequate, air transportation was used to move men and supplies to points along the line.

In general, the pipe line was constructed along a route most accessible from the standpoint of other types of transportation—water, rail, road, and air. But this fact failed to lessen the difficulties under which the job was done.

Signal Corps construction crews built pole lines parallel to the pipe line, sharing the hardships and dangers of the engineer petroleum distribution company construction crews.

Their rapidly constructed lines enabled the engineers to maintain constant telephone and teletype communication with pumping stations along the route to the rear. Without these communication facilities, operation of the pipe line and control of the valuable cargo would be impossible.

Former Pipe-Line Men Active on India-China Line

Lt. Col. Birney K. Morse, formerly chief engineer and director of Susquehanna Pipe Line Co., has had direct responsibility for the India-China products pipe line recently put into operation. He has served under Maj. Gen. Lewis A. Pick, a long-time Army engineer who has had an important part in the building of the Stilwell Road. Maj. Gen. Pick has been recently promoted from the rank of brigadier general.

Construction of the India-China line in the section between Calcutta and Assam has been under the direction of Col. William C. Kinsolving, who was formerly general manager of the Sun Pipe Line Co. before he became assistant director of transportation for Petroleum Administration for War, prior to his entering the Army.

J. R. Doles Becomes Vice President of Ajax

J. R. Doles, general superintendent of Ajax Pipe Line Corp., has been elected as a vice president of the company. He will continue to maintain his office at Springfield, Mo., where he has been located since he went with the company on June 8, 1930, shortly after its organiza-

tion. Doles started with the Oklahoma Pipe Line Co. as a laborer at Jenks, Okla., in 1909. In October 1923, he became a superintendent of O.P.L.

O. W. Bailey has been promoted to treasurer from assistant treasurer. C. L. Bushnell has been promoted from assistant secretary to secretary.

Magnolia Contracts for Reconditioning Work

Magnolia Pipe Line Co. has authorized and let contract to Oklahoma Contracting Co. for reconditioning and welding of two 8-in. lines of its Mid-Continent system between Alvord and Fort Worth, approximately 37 miles. The work is expected to get under way at once.

WEP Continues to Maintain High Throughput

War Emergency Pipelines, Inc., maintained high throughput for both crude oil and products lines in the period of April 28 through May 4. The crude oil 24-in. line from Longview, Tex., to Norris City averaged 318,202 bbl. daily. The products 20-in. line pumped 235,377 bbl. daily from Beaumont to the East Coast.

Gulf Lays Outlet From Pickton-Bacon Area

Gulf Refining Co.'s pipe-line department has completed survey for an 8-mile 4-in. line from the Pickton-Bacon line pool of southern Hopkins County, Texas, to its Mid-Continent-to-Port Arthur pipe-line system. It will tie into the system near Winnsboro in northern Wood County, Texas. The field has five producers prorated to 160 bbl. of oil daily and as many more tests drilling. This will be the first outlet for the pool.

South Plains Enlarges System in West Texas

South Plains Pipe Line Co. of Levelland, Tex., has authorized construction of a 16-mile 4 in. line extension from its Slaughter pool, Texas, system to the Whiteface or Northwest pool of Cochran County, Texas. Connections will be given to 17 leases with a present allowable of 1,220 bbl. of crude daily. This oil has been trucked from the area to the present time and is expected to stimulate activity in this area. The company supplies crude to the refinery at Levelland, recently purchased by Consumers Co-operatives Association, and also feeds crude to the 16-in. line of Stanolind Pipe Line Co. and Texas-New Mexico Pipe Line Co.

WEP Employes Organized by CIO

COLUMBUS.—All six divisions of the crude-oil and products systems of War Emergency Pipelines, Inc., from the Gulf to the Atlantic Coast are covered by contracts with Oil Workers International Union-CIO, as the result of negotiations just completed in Columbus, Ohio.

Vice President E. Carl Mattern, in charge of negotiations with WEP, announced that portal to portal pay had been won, together with severance pay up to 4 weeks, sick pay ranging up to 6 months for employes with 10 years' service, and $4.50 a day expense allowance for employes away from home overnight.

Cardinal Connects With Power Plant

Cardinal Oil Co. has completed an 11-mile 6-in. natural-gas line from the MacDer field of Pecos County, West Texas Permian basin, to West Texas Utility Co.'s electric power generating plant near Girvin, Tex. The line supplements the company's deliveries of gas from the White and Baker and Walker shallow areas.

ALTEN
Special Flexible
STUFFING
BOX

Heavy Pattern
Type with
Pumping Tee

ONE OF OVER 300
ALTEN OIL FIELD
PRODUCTS

See Composite Catalog for complete list or write us for catalog.

Fig. F-658

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FOUNDRY and MACHINE WORKS
Established 1889 . . . . . Lancaster, Ohio
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TEXAS OFFICE: 46 San Jacinto St., Houston 1, Texas
Leading Supply Stores Carry All Alten Oil Field Equipment

PIPELINE "Know-how"

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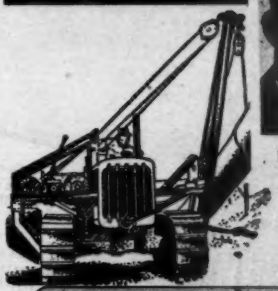
Partner



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COMPRESSORS WELDERS
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To the ends of the earth!
Before the war, Failing portable drilling units were searching the secrets of the Sahara, drilling for production in the Illinois basin, locating tin in Banka, taking core in the Texas panhandle, exploring for oil and mineral in the heart of India, the plains of New Zealand, the jungles of South America . . . Now, rolling with our armed battalions, on the job in every clime, Failing drills again travel to the ends of the earth, finding water to quench the thirst of our fighting men.
The Failing Holemaster 1500 Drill . . . civilian counterpart of the army unit . . . rugged, compact, mobile, with capacity for 1500-foot drilling . . . is now in limited production for the oil exploration program. Write for details. Consult Failing now!
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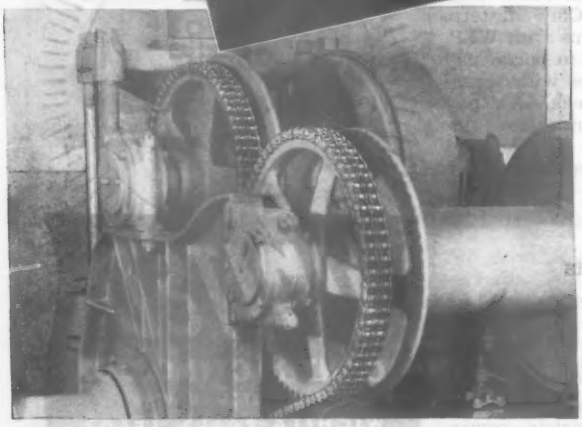
And to the Ends of the Earth Also, Went The Diamond Chain Drives

Reduced reproduction of recent Geo. E. Failing advertisement

Triple width Chains are used in the FAILING Model G-40 Split Shaft Type Power Take-off, and in the main drive case, with which is unitized the hydraulic oil pump drive. The slush pump is driven by a ¾" pitch triple width Chain.



Hoisting Drum driven by ¾" pitch double Chain
Sand Reel driven by ¾" pitch double Chain

It is entirely natural that Failing 1500 Holemaster Drills, used by our Armed Forces, should be equipped with dependable, long-life Diamond Roller Chain Drives, as their civilian predecessors and counterparts in oil field and other services have been equipped since 1930, when Geo. E. Failing Supply Co. developed their first portable drilling unit.

With such a background, it is entirely natural, also, that the military units have established outstanding records for successful performance, even under the most arduous conditions of usage, to match those of civilian units all over the world.

Through the quarter century since sound engineering principles have been supplanting the "more wood and iron" theory as a basis for the designing of oil field machinery, leading manufacturers have regularly equipped their products with Diamond high-efficiency Roller Chain Drives . . . DIAMOND CHAIN & MFG. CO., 475 Kentucky Ave., Indianapolis 7, Indiana. Tulsa Office: 2238 Terwilleger Blvd.

DIAMOND ROLLER CHAINS

Exploration and Drilling

Week's Highlights

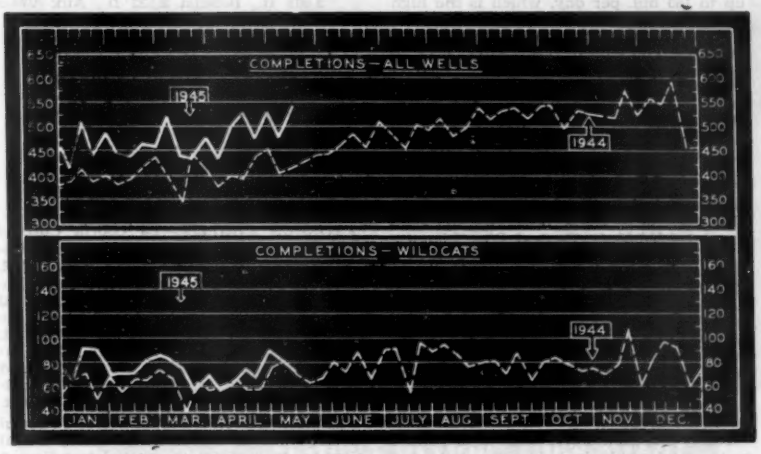
TWO new tests in the TXL pool in western Ector County, West Texas, have now established production in the Ellenburger. One of these had previously proven the Silurian productive in a drill-stem test. The pool now has three productive zones, including the original Devonian pay.

Shell Oil Co., Inc. 1-A Thomas, NW NW Section 8, Block 45, T-1-S, ¾ mile north and ¼ mile east of the discoverey well, missed the Devonian, had only a slight show in the Silurian, topped the Ellenburger at —6,361 ft. The marker was 280 ft. higher than in the discovery well which found water in the Ellenburger, but backed up to open the field with oil production from the Devonian. Shell drilled into the Ellenburger at 9,695 ft. and on drill-stem test at 9,731-52 ft., recovered 130 ft. of 43.5-gravity oil. A second drill-stem test at 9,777-9,802 ft. flowed 37 bbl. of clean oil in 30 minutes.

The second Ellenburger well, Phillips Petroleum Co. 1-A TXL, in Section 2, 1½ miles southeast of the discovery and 2 miles south plus 1 mile east of the Shell well, missed the Devonian, flowed 60 bbl. per hour from the Silurian on drill-stem test, and went on to test the Ellenburger. It topped Ellenburger at —6,318 ft., to make it the highest well of the three on the lower pay. On drill-stem test at 9,597-9,640 ft. it made an estimated 60 bbl. per hour flow of oil.

The result of the last two wells in the Ellenburger still fits the general concept of a large truncated structure. The Shell well being slightly lower than the Phillips, yet having only a slight show in the Silurian whereas the Phillips had good pay, does not quite fit in a picture of Ellenburger pay on top, a Silurian halo in the middle, and Devonian pay down the flank. However, with such large structural relief 200 to 300 ft. dip per mile, some faulting, or other irregularities, will probably be found.

The Phillips well indicates that the Silurian and Ellenburger pays will overlap in part of the field, indicating possibilities of dual completions. The two pays will be separated by an interval of around 1,200 ft. The economies of dual completion in 10,000-ft. holes are obvious.



Solid line charts current weekly completions, service wells in Eastern area included

COMPLETIONS IN ALL FIELDS . . .

Week ending May 12, 1945

	Oil	Gas	Dry	Total	Footage	Total Comp. to date 1945	Total Comp. to date 1944
New York	16	0	*16	32	44,806	441	332
Pennsylvania	41	3	†35	79	126,412	1,312	667
West Virginia	2	10	2	14	32,278	281	167
Ohio	4	12	2	18	39,868	277	321
Indiana	3	0	1	4	7,883	55	82
Kentucky	3	3	5	11	18,055	130	215
Illinois	27	0	18	45	92,254	555	572
Michigan	6	4	13	23	55,969	267	200
Kansas	18	1	13	32	99,064	543	615
Nebraska, Missouri, Iowa	0	0	0	0	0	12	13
Oklahoma	30	6	‡12	48	178,024	826	553
Texas:	71	14	44	129	587,897	2,563	1,797
North Central	18	1	20	39	106,478	728	501
West	27	3	7	37	161,789	684	539
Panhandle	2	4	0	6	18,847	207	61
Eastern	5	3	2	10	60,195	118	112
Gulf Coast	16	2	9	27	191,514	590	311
Southwest	3	1	6	10	49,074	236	273
Louisiana:	10	0	7	17	114,566	336	259
Northern	3	0	3	6	27,127	108	99
Southern	7	0	4	11	87,439	228	160
Arkansas	4	0	5	9	34,394	59	76
Mississippi	4	0	0	4	21,048	120	41
Southeastern States	0	0	1	1	5,606	13	12
Montana	5	3	2	10	22,246	110	86
Wyoming	2	0	0	2	13,558	74	57
Colorado-Utah	0	0	0	0	0	12	11
New Mexico	9	0	3	12	41,255	183	146
California	48	3	5	56	213,988	851	691
Total United States	303	59	184	546	1,749,171	9,020	6,913
Total previous week	242	54	177	473			
Total May 13, 1944	207	43	124	374			

Service wells incl.: *16, †31, ‡1.

ILLINOIS

27 New Wells Have High Average Initial Output

CENTRALIA.—The past week's round-up of completions in Illinois included 13 wells that started off at 100 bbl. up to 690 bbl. per day which brought the average per well of the 27 new oil wells up to 166 bbl. per day, which is the highest average in many months.

The largest completion of the week was Superior Oil Co. of California 3 C. H. Friedrick, C N½ NE SE NW 19-1s-2e, Boyd pool, Jefferson County, which produced 690 bbl. initially from Benoist sand at 2,053-90 ft. and Aux Vases sand at 2,135-59 ft. Ashland Oil & Refining Co. extended the Bible Grove pool in Effingham County with 1 Weibking, SE SE NE 29-6n-7e, which swabbed and flowed 580 bbl. per day and then pumped 480 bbl. per day from acidized McClosky lime at 2,856-60 ft. Central Pipe Line Co. 2 Gillard, NW NE SE 7-1n-10e, in the Bennington pool, Edwards County, flowed 403 bbl. initially from McClosky lime at 3,269-77 ft.

The Illinois State Geological Survey's review of April operations reports an extension to the Johnsonville pool and new pays opened in Brownsville, Kenner, Bennington, Noble and Mt. Carmel pools. Thirteen old wells worked over for production increases.

Thirty-five new operations were started in the past week, including the following wildcats: H. Luttrell 1 Phillips, SW NW SW 11-4n-7e, Clay County; J. W. Sheridan et al 1 Knapp, NE NW SW 23-2n-5e, and Pure 1 Holland, SW SW SE 13-1s-8e, Wayne County; Globe 1 McKinzie, SE SE NE 16-1s-10e, Edwards County; Ryan Oil 1 Joachim, NE NW NE 36-1s-14w, Wabash County; Texas 1 Jenkins, NW NW NE 9-5s-5e, Hamilton County; S. A. Gilpin 1 Williams, SW SW SE 6-5s-9e, White County; Ashland 1 R. H. Davis, SE NW SE 1-8s-8e, Gallatin County; F. M. Mudgett 1 J. Weyen, 330 ft. from north and 150 ft. from east lines NE¼ 9-8n-6w, and George Cassens 1 Ernst, SW SW SE 24-8n-6w, Macoupin County; Joe L. May 1 Prashun estate, C SW SE long SE¼ 31-2n-2w, Clinton County.

WILDCAT FAILURES IN ILLINOIS

White County: Phillips Petroleum 1 Pearce, SW SW SW 35-6s-10e, dry at 3,032 ft. Menard 2,055 ft., Cypress 2,566 ft., Benoist 2,700 ft., Aux Vases 2,825 ft., McClosky 2,890 ft., St. Louis 2,956 ft.

Effingham County: Standard Drilling 1 Grieseking, NW SW NE 19-7n-5e, dry at 2,434 ft. Golconda 1,891 ft., Cypress 2,003 ft., Benoist 2,132 ft., Aux Vases 2,409 ft., St. Louis 2,406 ft.

SOUTHWEST TEXAS

Triple Sand Completion Testing in Jim Wells Co.

CORPUS CHRISTI.—La Gloria Corp. 5 Chas. F. H. Von Blucher, Southeast Premont area, Jim Wells County, Survey 348, is testing for a triple sand completion. The well was perforated in the Conrad sand at 7,200-20 ft. to produce through the tubing, in the Marie sand at 7,138-68 ft. to produce between the tubing and intermediate string, and in the Claude sand at 7,022-52 ft. to produce between the 5-in. and 7-in. strings. Total depth is 8,200 ft.

Humble Oil & Refining Co. 1-J Duval County Ranch Co., Gormac field, Duval County, on a 24-hour potential test flowed 91 bbl. 24° gravity oil through a ¼-in. choke, from perforations at 2,449-58 ft. Tubing pressure 60 lb., casing pressure 560 lb., gas-oil ratio 121 to 1, total depth 2,460 ft., with 5½-in. casing at 2,458 ft.

Transwestern Oil Co. 1 Wm. Altman estate, wildcat 15 miles north of Goliad, in B. P. Tumlinson Survey, Goliad County, made a drill-stem test at 7,750-59 ft., using 800-ft. water cushion, and recovered 1,650 ft. of salt water and water cushion. Operators then drilled to total depth of 8,000 ft., ran electric log, and are now preparing to set casing.

Humble 1 H. and R. C. Roos, a wildcat 2 miles northwest of Hinds and 7 miles southwest of Charlotte, in Williams & Austin Survey 964, Frio County, on drill-stem test at 7,979-90 ft., steady blow, recovered 30 ft. of gas-cut mud. Total depth is 7,990 ft.

Continental Oil Co. 2-I M. M. Garcia, Boyle field, Starr County, in Porcion 92, flowed on 24-hour potential test 53 bbl. of 47.4° gravity oil through 10/64-in. choke, no water. Tubing pressure 125 lb., casing pressure 950 lb., gas-oil ratio 370 to 1, perforations at 4,087-93 ft. Total depth is 4,220 ft. with 6-in. casing at 4,147 ft.

SOUTHWEST TEXAS WILDCAT FAILURES COMPLETED

Atascosa County: Gulf Oil Corp. 1 Ada Tom, 12½ miles southwest of Hobson field in John Penson Sur. 148, dry at 10,528 ft.

LaSalle County: Quintana Petroleum Corp. 1-F South Texas Syndicate, H&GN Sur., Sec. 76, 15 miles south of Fowlerton, dry at 6,640 ft.

Medina County: John I. Moore 1 A. J. Wurzbach, Juana Delgado Sur. 1, 5 miles northeast of Castroville, dry at 3,194 ft.

Starr County: Coastal Refineries, Inc. and Henshaw Bros. 1 Yndalecio Sanchez, Sur. 544, 14 miles north of Roma, dry at 5,023 ft.

K. D. Owen and P. R. Rutherford 1 Mrs. B. A. Pierce Unit, Porcion 93, 12 miles northeast of Rio Grande City, dry at 4,215 ft.

Victoria County: Butcher-Arthur, Inc. and Taylor Refining Co. 1 M. H. Williams et al, F. Bueno Sur., dry at 4,219 ft.

Webb County: R. F. Schoolfield 1 J. C. Martin, SK&K Sur. 139, 3½ miles southwest of Bruni, dry at 2,371 ft.

TEXAS GULF COAST

Moody Ranch Discovery Flows 78 Bbl. Potential

HOUSTON. — Crown Central Petroleum Corp. 1 W. L. Moody, Jr., discovery well on the Moody Ranch field, about 5 miles southwest of Francitas field, Jackson County, on a 24-hour potential test flowed 78 bbl., no water, through 6/64-in. choke, tubing pressure 1,800 lb., casing pressure 2,000 lb., gravity test not run, gas-oil ratio 2,600 to 1. Gravity test on the first production test was 42.3°, however, it is believed to be higher on the potential test. Drill pipe was stuck in this hole while drilling at 9,280 ft. After failing to recover the drill pipe, it was cemented, then perforated at 8,834-40 ft. and is producing from this point.

Pan American Production Co. dual-completed its 1 L. E. Posey, east extension and new sand at Pinehurst field, Montgomery County. The completion was in sands at the 9,600-ft. and 11,000-ft. levels. It flowed a potential of 288 bbl. daily on ¼-in. choke from perforations at 11,002-086 ft., tubing pressure 2,300 lb., gravity 53.2°, gas-oil ratio 10,118 to 1, and from perforations at 9,564-87 ft. and 9,592-9,622 ft. it made 75 bbl. daily of 60.2° gravity condensate through ¼-in. choke, with casing pressure 1,400 lb., and gas-oil ratio 24,160 to 1. Wilcox was topped at 8,365 ft. Total depth is 11,820 ft. with 7-in. casing set to 11,266 ft.

Sun Oil Co. 1 Eliz. H. Moore Est., in F. W. Plummer Survey, Double Gum area, 6½ miles northwest of Winnie in Chambers County, is still testing through perforations at 8,280-85 ft., last gage being 35 bbl. oil, 19 per cent salt water, in 15 hours through 10/64-in. choke, tubing pressure 225 lb., casing pressure 250 lb. Total depth is 9,750 ft.

American Republics Co. 32 Brooks, in George W. Brooks League, opened a deeper producing sand for the Silsbee pool

DAILY AVERAGE PRODUCTION FOR WEEK

	May 12 crude oil	Distillate, allied products	May PAW quota all oils	May 5 crude oil
Alabama	450	.....	300	400
Arkansas	79,600	5,200	85,200	79,800
California	925,750	60,280	1,007,280	922,450
Colorado	11,050	.....	10,500	10,350
Eastern	63,700	6,600	73,800	64,100
Illinois	195,800	12,000	217,000	195,200
Indiana	11,300	.....	13,000	11,650
Kansas	270,900	4,200	278,200	253,150
Kentucky	27,100	2,200	33,200	27,850
Louisiana	370,900	42,000	402,000	370,750
North Louisiana	71,100	.....	.....	70,950
South Louisiana	299,800	.....	.....	299,800
Michigan	50,300	700	47,700	45,750
Mississippi	54,250	.....	53,000	54,900
Montana	23,550	300	23,300	23,350
Nebraska	900	.....	1,000	900
New Mexico	103,700	4,800	109,800	103,650
Oklahoma	385,150	28,500	396,000	384,350
Texas	2,176,150	162,000	2,332,000	2,186,150
East Texas	379,800	.....	.....	379,800
East Central Texas	138,200	.....	.....	138,200
North Central Texas	153,900	.....	.....	153,900
Texas Panhandle	90,000	.....	.....	90,000
West Texas	495,300	.....	.....	495,300
Southwest Texas	355,650	.....	.....	365,650
Texas Gulf Coast	563,300	.....	.....	563,300
Wyoming	101,750	3,200	115,200	102,100
Total United States	4,852,300	331,980	5,198,480	4,836,850
Change from previous week	up 15,450			

Total production January 1-May 12, 1945 ..... 629,390,350 bbl.
Same period last year ..... 586,970,511 bbl.

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YOUNGSTOWN, OHIO . . . OFFICES IN 31 CITIES

of Hardin County, flowing a potential of 126 bbl. of 32.9° gravity oil daily through 3/16-in. choke with 375 lb. pressure on tubing and gas-oil ratio 1,682 to 1. Production was from a sand in the middle Yegu series, with perforations at 7,548-7,552 ft. Other production in the pool has been from sands at 6,800 ft., 6,900 ft., and from 7,450 ft.

Humble Oil & Refining Co. 1 Joe Korenek et al, south flank secor at Danbury dome in Brazoria County, was completed as a dry gas well through perforations 6,520-27 ft. and shut in.

Seaboard Oil Co. of Delaware 2 Reba S. Snell, new producer in the El Campo field of Wharton County, flowed 105 bbl. of 40.1° gravity oil in 24 hours through ½-in. choke on Railroad Commission potential from perforations at 6,658-64 ft., tubing pressure 1,925 lb., casing pressure 2,525 lb., gas-oil ratio 6,137 to 1. Total depth is 7,600 ft., with plugged-back depth 6,785 ft. Top of this sand was picked at 6,645 ft .

UPPER GULF COAST SUCCESSFUL WILDCAT COMPLETIONS

Colorado County: Rock Island gas discovery—Sinclair Prairie Oil Co. 1 Felix Fehrenkamp, SA&MG Sur., Abst. 537, 5 miles northeast of Rock Island, total depth 11,000 ft. Perforations 9,678-95 ft., PT 6,000,000 cu. ft. gas open flow. On 3/16-in. choke flowed 2,160,000 cu. ft. gas daily, no gage on condensate, tubing pressure 2,525 lb.

Montgomery County: Pinehurst new sand condensate—Pan American Production Co. 1 L. E. Posey, in John B. Richards Sur., Abst. 449, total depth 11,820 ft., dual completion, top Wilcox 8,365 ft., perf. 11,002-086 ft., PT 288 bbl. day ¼-in. choke, tubing pressure 2,300 lb., gravity 53.2° gas-oil ratio 10,118 to 1, perf. 9,564-87 ft., 9,592-9,622 ft., PT 75 bbl. day ¼-in. choke, gas-oil ratio 24,160 to 1, casing pressure 1,400 lb., gravity 60.2°, no water.

UPPER GULF COAST WILDCAT FAILURES COMPLETED

Jackson County: Butcher-Arthur, Inc. 1-B Andrew Lorenzen, John L. Linn Sur., Sec. 5, 8 miles south of El Toro, dry at 6,920 ft.

Brazoria County: G. S. Hinkle 1 H. L. Trammell, David Talley Sur., 1½ miles northeast of Sandy Point, dry at 6,677 ft.

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ROCKY MOUNTAIN

North Baxter Basin to Have Deep Test Drilled

DENVER.—North Baxter Basin, Sweetwater County, Wyoming, which has been producing gas since 1926, principally from the Dakota sandstone, and which is one of the major sources of supply for the Mountain Fuel Supply Co. trunk line to Salt Lake City, is to have a deep test to the Weber (Tensleep) sand, the horizon in which Sinclair-Wyoming Oil Co. made an oil discovery last winter in the Big Sand Draw gas field 90 miles to the north and east. The wildcat is to be drilled by Transcal Petroleum Corp., of Los Angeles, a newcomer in the Rocky Mountain area, which is planning an extensive exploration program. The description is 1 Union Pacific, NE SE 11-19n-104w. Mountain Fuel Supply Co. owns the gas rights for the field. Continental Oil Co., as successor to the old Marland Oil Co., and Sinclair-Wyoming Oil Co., as successor to the Producers & Refiners Corp, control the oil rights on most of the acreage, some being held by Mountain Fuel Supply. Continental and Sinclair assigned 280 acres on top of the structure to Transcal for the test.

San Juan Basin deep test.—Transcal Petroleum Corp. is moving in a heavy rotary to complete a wildcat to the Dakota sands in the Kutz Canon gas field in San Juan County, northwest New Mexico. It is 1 Government, NW NW 28-28n-10w. The field has been producing gas from the Picture Cliff sand of Upper Cretaceous age for a number of years. This well was spudded in 1939 by the Kutz Canon Oil & Gas Co. A year ago it was taken over by Tanscal and was deepened to 3,420 ft. where it has been standing awaiting a heavier rig. The area has never been tested to the Dakota, which is expected at around 6,500 ft. Location is near the center of the basin and in an area where a number of shallow wells have been completed as small producers.

Big well at Crook's Gap.—Sinclair-Wyoming Oil Co. 2 Unit, NW SE NE 13-28n-93w, Crook's Gap field, Fremont County, Wyoming, west offset to the discovery, flowed 2,687 bbl. in 15 hours, an average of 178 bbl. an hour, or at the rate of 4,300 bbl. daily, from the Lakota sand. The discovery well made 1,478 bbl. in 24 hours through the 2½-in. tubing. The second well was drilled to 5,066 ft., plugged back to 5,054 ft., and is producing through 292 holes in the casing at 5,005-52 ft.

Sand Draw discovery given open flow test.—Sinclair-Wyoming's 37-mile pipe line from Big Sand Draw field to a connection with the Crook's Gap line began running oil April 29. The discovery well in 14-32n-95w, completed last winter, flowed 367 bbl. in 8 hours through casing and tubing. Following completion of pipe line it was given a wide-open test and made 1,300 bbl. in 16 hours. It is on steady production and making 1,100 bbl. per day.

Southwestern Colorado wildcat.—Southern Union Production Co. is rigging up for a test on the Colorado side of the Barker Creek gas field in its 12 Barker Creek, NE SW SW 2-32n-14w. The lease

recently was purchased from the government. The Dakota is the principal producing horizon on the New Mexico side. The company recently completed a deep test to the lower Pennsylvanian which made 60,000,000 cu. ft. per day at 8,400-8,570 ft.

Kevin-Sunburst extension well improves.—Consolidated Gas Co. 1 Gillespie, SE NW SE 15-35n-4w, which opened a new pool on the west side of the Kevin-Sunburst field, made 100 bbl. of oil and 100 bbl. of water on April 23; 100 bbl. of oil and 165 bbl. of water 3 days later, and on latest test made 5 bbl. of oil per hour with 6.6 bbl. of water or at the rate of 120 bbl. of oil and 130 bbl. of water, the oil increasing and water decreasing.

MONTANA WILDCAT FAILURE

Toole County, Dunkirk: Thorpe & Walker 1 O'Laughlin, SW SW NW 3-31n-1w, TD 1,821 ft., Ellis-Madison 1,820 ft., dry.

CALIFORNIA

Paloma Outpost to Test Deep Sand Zone

LOS ANGELES.—Superior Oil Co. should soon be able to evaluate the new deep zone in the Paloma field of Kern County. Superior's potential producer, 74-34 Houchin in Section 34-21s-26e, was drilled to 12,374 ft., but plugged back to 12,124 ft. and a string of 7-in. was landed at 11,815 ft. The company has run 356 ft. of 5-in. liner, including 160 ft. of 125 mesh perforations, and after landing at 12,124 ft. cemented through perforations at 11,920 ft.

This indicates the company will test a 165-ft. interval between 11,190 ft. and 12,124 ft., and based on core recoveries is expecting to complete a good flowing well. The formation is a little tight but on test recently, the well showed a recovery of 1,500 ft. of gassy mud and 3,984 ft. of clean oil on a 6-hour test at 11,767-12,095 ft.

This north line outpost may prove up considerable additional acreage on the north flank of the structure. In addition to finding this new sand, Superior also proved the existence of a much greater thickness of oil sand in the Paloma zone than had been suspected. The Unit Plan, under supervision of Western Gulf, has already started to deepen 61-33 in Section 33-31s-26e, in order to take in more of the Paloma zone.

East of the present limits of Paloma sand production, Western Gulf is making good progress with 67-6 L.A.A.C. in Section 6-32s-27e. To date it has logged three separate zones, the Symons, and an intermediate oil sand between the Symons and Paloma provided the present sand proves to be the equivalent of the Paloma. The outcome of work on this well together with Superior's 74-34 Houchin may have an important effect on future operations at Paloma.

With drilling operations increasing consistently at Buena Vista Hills, this field will reach substantially higher levels within the next several months. Production is found at shallow depths, but so far most of the wells have flowed naturally and are holding up well. The drainage area between wells is relatively large due to the large amount of acreage involved and operators are not crowding wells into a limited area. The edge of production has been established in the west and southwest but remains undetermined to the east and southeast.

CALIFORNIA WILDCAT FAILURES

Kings County, Reef Ridge: Shell 41-2 Crow, 2-23s-16e, bottomed in hard gray sand, no important showings, TD 7,825 ft.

Orange County, Yorba Linda: Skylark Manufacturing Co. 1 Howe, 22-3s-9w, bottomed in gray water sand, no important showings, TD 4,340 ft.

PERMIAN BASIN

Cochran Co. Test Looks Good in San Andres

MIDLAND.—Stanolind Oil & Gas Co. 1 J. F. Edwards, Section 13, Block L, Public School Lands, is a prospective discovery in the San Andres for Cochran County. It is 9 miles east of the southwest corner of the county. San Andres was topped at 4,310 ft. On a core from 5,080-95 ft., 4 ft. of dense dolomite and 5 ft. of dolomite showing some porosity and stains was recovered. A 1-hour drill-stem test was made from 5,024-5,102 ft. Recovery was 550 ft. of clean oil and 180 ft. of oil slightly cut with fresh water. Shut-in pressure was 1,500 lb. Total depth is 5,102 ft. Operator is running casing. Stanolind 1 E. L. Slaughter, wildcat 1½ mile south of Morton, Cochran County, took a drill-stem test from 10,770-893½ ft., total depth, using 2,700 ft. of water blanket. Thirteen stands of drilling mud and water blanket with no shows was recovered. Ellenburger was topped at 10,383 ft. It was circulating while waiting on orders.

Crane County: Atlantic Refining Co. 1-A University, wildcat 6 miles west of the north end of the McElroy field, recovered a heavily gas and distillate-cut water cushion on a drill-stem test from 7,913-8,024 ft. in the Devonian. On a 1-hour drill-stem

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test from 8,028-80 ft., 60 ft. of drilling mud with no shows was recovered. Operator is drilling ahead. Gulf Oil Corp. 1-E U. Henderson, wildcat southwest of the Sandhills district in southwestern Crane, is plugging back from 6,625 ft. to 4,450 ft. for completion in the zone which showed for 10,000,000 cu. ft. of gas on a drill-stem test. Magnolia Petroleum Corp. has staked a 7,000-ft. Ordovician wildcat in southwestern Crane 2½ miles northwest of the McKee pool and the same distance from the Abell pool in northern Pecos County. Both pools produce from the Ordovician. It is 1-B Tucker and is 1,868 ft. from the northeast line and 330 ft. from the northwest line of Section 25, Block 1, H&TC Survey.

Ector County: Phillips Petroleum Co. has staked a wildcat 2¼ miles southeast of Rowan Drilling Co. 1 TXL, nearest producer in the TXL Devonian area. It is 1-E TXL, 660 ft. from the north and west lines of Section 39, Block 45, T-1-S, T&P Survey. One mile northwest of Rowan 1 TXL, Mid-Continent Petroleum Corp. has located 1-B TXL 660 ft. from the south and east line of Section 19, Block 45, T-1-S, T&P Survey, an 8,500-ft. wildcat to the Silurian. Cities Service Oil Co. will drill 1-C Thomas, a northwest offset to Shell Oil Co. 1-A Thomas, new Ellenburger prospect, 1 mile and 1 location east of the TXL-Devonian producer. It is 660 ft. from the south and east lines of Section 6, Block 45, T-1-S, T&P Survey. Phillips 1-A TXL, which showed for production in the Silurian, has indicated production from the Ellenburger topped at 9,610 ft. On a drill-stem test 9,597-9,600 ft., the well headed 40.5°-gravity oil when the tool was pulled. It is drilling below 9,681 ft. It will be drilled to 9,700 ft. and a drill-stem test is to be run from 9,640-9,700 ft.

Phillips 1 Talvez, on the southeast side of the Keystone-Ellenburger pool of northern Winkler County, on a 90-minute drill-stem test of the Silurian from 7,839-8,009 ft., gas came to the surface in 69 minutes. Recovery was 800 ft. of drilling mud and 6,200 ft. of oil-cut mud. It is drilling ahead. Stanolind and Shell 1 Waddell, northwest outpost to the Wheeler-Ellenburger pool of Winkler County, recovered 460 ft. of oil and gas-cut drilling mud on a 2-hour and 15-minute drill-stem test in the Devonian from 8,577-8,641 ft. It is drilling ahead.

WEST TEXAS WILDCAT FAILURES

El Paso County: J. S. Meriweather et al 1 Luis Bobadilla, Sur. No. 254, 25 mi. NE Vinton, dry, TD 1,578 ft.

Pecos County: Humble 3 El Paso State National Bank, Sec. 23, Blk. 140, T&St.L. Sur., 3 mi. S Apco-Warner pool, elev. 2,562 ft., Ellenburger 4,532 ft., dry, TD 4,551 ft.

Pure 1 Neal Tanquary, Sec. 4, Blk. 183, W. J. Mitchell Sur., elev. 3,319 ft., Lamar 4,721 ft., Delaware 4,758 ft., dry, TD 5,260 ft.

Scurry County: Geo. P. Livermore, Inc., 1 Rollins, Sec. 160, Blk. 97, H&TC Sur., elev. 2,328 ft., San Angelo 2,400 ft., Clear Fork 3,135 ft., dry, TD 3,954 ft.

SOUTHEASTERN NEW MEXICO

HOBBS. — Continental Oil Co. 3-B-23 Skaggs, in the Skaggs field of Lea County, found top of pay at 7,667 ft. in a core taken from 7,660-78 ft. Operator was preparing to take a drill-stem test at total depth of 7,698 ft. Skelly Oil Co. 2 Johnson, wildcat 2 miles south of 2 Steeler, is drilling below 3,275 ft. in dolomite. Phillips Petroleum Corp. 4 Lea-Mex, wildcat northeast of the Maljamar field, is drilling ahead at 11,835 ft. in lime and shale. The Texas Co. 1 Eaves, wildcat 14 miles north of Hobbs, is drilling below 7,702 ft. in lime.

SOUTHEASTERN NEW MEXICO SUCCESSFUL WILDCAT

Lea County: Extension to old oil pool—Samedan Oil 1 Boyd, 23-22s-37e, 2 mi. NW Drinkard-Yeso pool, elev. 3,330 ft., flowed 192 bbl. day through ¼-in. choke on tubing, perf. 6,370-95 ft. and 6,415-40 ft., Clear Fork 5,500 ft., gravity 39.6°, gas-oil ratio 1,127, TD 6,455 ft.

SOUTHEASTERN NEW MEXICO WILDCAT FAILURES

Eddy County: Martin Yates, Jr. 2 Yates-McKee, 24-19s-29e, 3 mi. S and 1 mi. E Turkey Track pool, elev. 3,347 ft., dry, TD 1,880 ft.

Lea County: Texas 1 Reeves, 26-18s-35e, 3 mi. SE Vacuum pool, elev. 3,873 ft., San Andres 5,370 ft., dry, TD 5,655 ft.

SOUTH LOUISIANA

Bayou Mallet Discovery Makes 122 Bbl. Potential

NEW ORLEANS. — Union Sulphur Co., Inc. 1 Mervine Kahn, discovery well of Bayou Mallet field, 25-7s-1e, flowed a potential of 122 bbl. per day on 7/64-in. choke, gas-oil ratio 595 to 1, tubing pressure 1,300 lb., gravity 37.6°, 10 per cent water. Total depth is 10,320 ft. with 7⅝-in. casing at 9,160 ft., and 5-in. liner set at 9,840 ft., perforations 9,610-14 ft.

Humble Oil & Refining Co. 4-B Petit Anse Co., 23-13s-5e, at Avery Island field in Iberia Parish, is flowing 13 bbl. an hour of 35.2 gravity oil, no water, from perforations 9,755-82 ft., with 2½-in. tubing set at 9,703 ft. This test showed gas-condensate several days ago in a deep sand for the field through perforations at 11,208-16 ft.

Humble 4 I. R. Price, 25-16s-22e, at Delta Farms field in Lafourche Parish,

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is completing through perforations at 9,426-32 ft., with 2-in. tubing set at 9,381 ft., packer at 9,377 ft. Well is flowing 12 bbl. an hour on 11/64-in. choke, gas-oil ratio 641 to 1, tubing pressure 900 lb., gravity 35.4°. Total depth is 9,500 ft. with 5½-in. casing set at 9,491 ft.

SOUTH LOUISIANA SUCCESSFUL WILDCAT

Acadia Parish: Bayou Mallet oil discovery —Union Sulphur Co. 1 Mervine Kahn, 25-7s-1e, total depth 10,320 ft., perf. 9,610-14 ft., PT 122 bbl. day through 7/64-in. choke, gas-oil ratio 595 to 1, total pressure 1,300 lb., gravity 37.6°, 10 per cent water.

SOUTH LOUISIANA WILDCAT FAILURE

Vermilion Parish: The California Co. 1 Jan Jean LaFitte, 35-16s-2e, dry at 11,850 ft.

KANSAS

Extension for Ryan Pool Makes Fifth Producer

THE Ryan pool of Rush and Pawnee counties is completing a fifth producer with a one-half extension. Magnolia Petroleum Co. 1 Peterson, SE SE NW 35-19-16w, flowed 2½ bbl. of oil per hour from the Arbuckle at 3,710-12 ft. Operators are preparing to acidize. The Ryan pool was discovered early in the year by Inland Oil Co., and added two new wells besides the extension in the past week. They are Bird-Handley-Sheedy 1 Dirks, NW NW NE 2-20-16w, and Gulf Oil Co. 1 Nelson, NE NE NW 2-20-16w. Inland Oil is drilling an offset to the discovery and Stanolind Oil & Gas Co. and Magnolia have drilling wells in the area.

In the Forest City basin, R. S. Turner Producing Co. 1-A Livengood, NE SW SW 3-1-15e, is being completed as the third well of the new Livengood pool of Brown County. The Hunton lime was topped at 2,616 ft., and 5-in. casing was set at 2,628 ft. This well is 1,320 ft. south of the discovery well.

A total of 18 oil wells were completed in Kansas this past week, one of them being a wildcat discovery, the International Oil Co. 1 Doyle. The combined initial production of the oilers was 8,141 bbl. per day. The one gas well, completed in the Hugoton field, gaged 27,648,000 cu. ft.

KANSAS SUCCESSFUL WILDCAT

Dickinson County: New oil pool — Old name revived, Lost Springs, North— International Oil 1 Doyle, E/2 NE SE 22-16-4e, pump potential of 88 bbl. oil from Mississippi lime at 2,227-2,308 ft., TD 2,308 ft., Mississippi chat 2,275 ft.

KANSAS WILDCAT FAILURES

Barton County: Lion 1 Wolf, NE NW NW 36-19-15w, dry, TD 3,739 ft., Reagan 3,685 ft.

Barton County: Lauck & Moncrief 1 Bock, NE NE SE 30-18-11w, dry, TD 3,485 ft., Arbuckle 3,433 ft.

Ellsworth County: W. M. Bartlett et al 1 Zahradink, SE SE NW 18-15-10w, dry, TD 3,344 ft., Arbuckle 3,308 ft.

Leavenworth County: Brewer & Kelly 1 Thomas, SW SW SE 24-11-22e, dry, TD 705 ft.

Reno County: Phillips et al 1 Baden, SW SW NW 16-26-10w, dry, TD 4,428 ft., Arbuckle 4,396 ft.

Rooks County: Ed Swearer et al 1 Bigge, W/2 NW SW 29-6-18w, dry, TD 3,644 ft., base Kansas City 3,528 ft.

Stafford County: Mid Plains and Ainsworth 1 Heneisen, NW NW NW 6-21-14w, dry, TD 3,735 ft., Arbuckle 3,710 ft.

OHIO, KENTUCKY

Muskingum Co. Test Opening New Gas Pool

COLUMBUS, Ohio.—B. G. Bartley 1 John Burrier, Section 8, Hopewell Township, Muskingum County, gave indications of opening a new gas pool two miles southeast of the Cottage Hill oil field. Clinton sand was topped at 3,241 ft., and after drilling in 15 ft., the well gaged 1,300,000 cu. ft. with a rock pressure of 1,010 lb.

Obermiller et al 1 J. Galbreath, Section 23, Knox Township, Columbiana County, shut in after shot, is good for 3,061,000 cu. ft. with 1,350 lb. pressure. Oriskany sand was found at 3,527-3,555 ft. and drilling stopped at 3,566 ft.

The Huntington pool in Lorain County was extended one location to the west by the Ohio Fuel Co. 1 G. E. Lamb, Lot 10. Clinton sand was 2,416-2,429 ft. gaged 5,100,000 cu. ft. Additional wells will be started to the west and north.

OHIO SUCCESSFUL WILDCATS

Muskingum County, Hopewell Township: B. G. Bartley 1 John Burrier, Section 8, Clinton 3,241-3,256 ft. S.I.S., 1,300,000 cu. ft., TD 3,256 ft.

OHIO WILDCAT FAILURES

Tuscarawas County, Lawrence Township: Ohio Fuel 1 R. V. Kline, Section 26, Clinton 4,396-4,471 ft., dry, TD 4,533 ft.

INDIANA

EVANSVILLE, Ind.—Three oil wells and a dry hole were reported as completions in the past week. The best of the wells was a 190-bbl. producer, Superior Oil Co. No. 4 Armstrong Unit, SW NE SW 19-2s-11w, Gibson County, producing from Benoist sand at 2,092-96 ft. and 2,109-19 ft.

The latest report from Kingwood Oil Co.'s Tennessee wildcat 1 G. E. Harrison, NE cor. 12-H-5e, Cumberland County, had it drilling at 3,595 ft. in very hard Knox dolomite, with no oil or gas yet showing.

WESTERN KENTUCKY

OWENSBORO, Ky.—Several wildcat tests in Western Kentucky are attracting attention because of their favorable showings.

One mile south of Dixie, Henderson County, and 2½ miles from production J. W. Carter and Salee Bros. 1 Liles, 21-0-22, pumped 15 bbl. per hour from Cypress sand at 2,289-2,301 ft., total depth.

Ashland Oil & Refining Co. 1 Verona Coal Co., 7-0-21, in the Hitesville district on a drill-stem test of Cypress sand at 2,279-86 ft. recovered 835 ft. of oil, 90 ft. of mud and no water. It is a mile from other oil wells.

Sinclair Prairie Oil Co. 1 Lucille Cavanaugh, a wildcat in 12-N-23, had McClosky lime at 2,600-11 ft., 2,649-68 ft. and 2,690-2,707 ft. total depth 2,772 ft. swabbed 55 bbl. per day.

SUCCESSFUL WILDCAT COMPLETION IN WESTERN KENTUCKY

Webster County: Sinclair Prairie 1 Lucille Cavanaugh, 12-N-23, McClosky lime 2,600 to 2,707 ft. at intervals, TD 2,772 ft. Swabbed 55 bbl. in 24 hours.

EASTERN KENTUCKY OPERATIONS

ASHLAND.—Completion of a gas well in the Maxon with a daily open flow of 4,496,000 cu. ft. of gas highlighted operations in the eastern Kentucky field during the week.

Kentucky-West Virginia Gas Co. completed this well, located on the George W. Elswick farm on Booker Branch of Caney Creek in Pike County. The well was No. 5,572 and total depth was 1,668 ft.

Inland Gas Corp. completed No. 271 on the Emmanuel Meade farm on Abbott Creek in Floyd County, at a total depth of 958 ft. with a daily open flow of 223,000 cu. ft. of gas in the Maxon.

J. H. Hammond et al completed No. 256, on Bull Creek of Licking River in Magoffin County at a total depth of 2,405 ft., as a dry hole.

Patterson, Dyer & Roder completed a well on the Lee Bingham farm in Jackson County, at a total depth of 1,059 ft., with an estimated daily production of 10 bbl. of oil.

Two wells, one on the Henry Harmon farm and the other on the Phil Cassidy farm in Martin County, were marked "will make gas well."

EASTERN TEXAS

Freestone County to Get Travis Peak Test

DALLAS.—The Texas Co. will drill a wildcat about 3 miles east of Teague, Freestone County. It will be a Travis Peak test. It is 1 E. B. Hamm, 525 ft. from the southeast line and 2,025 ft. from the southwest line of the R. Lawson Survey. Texas 1 Dr. W. N. Sneed, southwest outpost to 1 McKnight, gas-distillate discovery well 3 miles southwest of Fairfield in Freestone County, cored hard lime with no shows from 7,295-7,305 ft. Drilling has been held up on account of fishing job at 7,528 ft., total depth.

Humble Oil & Refining Co. 1 Pickering Lumber Co., wildcat in the S. Francois Survey, Shelby County, recovered 3,000 ft. of gas-cut mud, 1,450 ft. of salt water on a drill-stem test from 8,317-8,694 ft. showing 3,000 lb. work pressure and 4,150 lb. shut-in pressure. It is drilling below 8,712 ft. in hard sandy shale. Humble 1 W. C. Ayers, J. Salinga Survey, southeast offset to 1 Bruce, recent discovery, 4½ miles south of Edgewood, Van Zandt County, made three attempts to run a drill-stem test with packer at 8,534 ft. and failed. A core from 8,556-75 ft. recovered 14 ft. of broken silty sand and sandy shale with slight porosity. It is drilling below 8,575 ft. in lime and shale. Humble 1 Manness, wildcat 8 miles southeast of Rusk in Cherokee County, on a 3-hour drill-stem test in the Woodbine from 4,550-70 ft. recovered 150 ft. of mud and 3,750 ft. of salt water. Pecan Gap chalk was topped at 3,890 ft. Top of Austin chalk is 4,340 ft. It is drilling below 4,570 ft.

Hunt Oil Co. 1 V. Pepper, wildcat 2½ miles southeast of Cash in Hunt County, after drill-stem test in the Cotton Valley zone, failed to recover any shows, was preparing to perforate higher in the Cotton Valley. Total depth is 9,390 ft. in Smackover. Shell Oil Co., Inc., and Lone Star Production Co. 1 Tandy, wildcat 12 miles north and slightly east of Centerville, Leon County, recovered 270 ft. of gas-cut mud and 2,500 ft. of salt water on a drill-stem test from 8,944-65 ft. It is drilling ahead at 9,473 ft. in lime and shale.

EASTERN TEXAS WILDCAT FAILURES

Falls County: H. C. Cockburn 1 Cockburn, A. de la Serfa Leag., J. Menefee Sur., 9 mi. NE Marlin, elev. 408 ft., Travis Peak 4,820 ft., Cotton Valley 6,175 ft., Smackover 7,134 ft., dry, TD 7,606 ft.

Henderson County: Texas 1 G. M. Morse, S. Calderon Sur., 1 mi. S Chandler, elev. 359 ft., massive anhydrite 9,082 ft., James 9,865 ft., Travis Peak 10,302 ft., dry, TD 10,643 ft.

Houston County: Keith Railway Equipment 1 Leo Knox, Omy Weir Sur. A-93, 5 mi. W Lovelady, elev. 312 ft., dry, TD 2,800 ft.

N. CENTRAL TEXAS

Cooke Co. Tests Get Good Shows

WICHITA FALLS.—The Texas Co. 1 Buckeley, wildcat 15 miles northeast of Gainesville in Cooke County, made a 30-minute drill-stem test from 6,442-49 ft. and recovered 90 ft. of oil and gas-cut drilling mud with bottom-hole pressure of 500 lb. It was drilling below 6,545 ft. in lime. Texas 1 Murrell, northeast outpost to the company's Ellenburger discovery in northeastern Cooke, ran a drill-stem test from 4,766-80 ft., showed gas in 9 minutes and recovered 380 ft. of oil. Total depth is 5,494 ft. It is waiting on pumping equipment. Kerlyn Oil Co. 1 Norman, wildcat 2 miles southwest of Woodbine, is dry at 4,541 ft. in shale.

Mid-Continent Petroleum Corp. 1 S. B. Burnett Est., wildcat 3 miles southwest of the Ross pool in King County, logged lime with odor of oil from 5,473-78 ft. A 40-minute drill-stem test was taken from 5,465-88 ft. Gas came to the surface in 15 minutes. Recovery was 270 ft. of oil-cut mud, 2,400 ft. of salt water and 2,520 ft. of free oil. It is drilling ahead at 5,577 ft. in lime.

Clay County: Bridwell Oil Co. 1 Vaughn-Holt Unit, wildcat 5 miles southwest of Blue Grove, is dry at 6,008 ft. in Ellenburger. W. H. Hammon 1 Bryans, wildcat 1 mile east of Dean, topped the Ellenburger at 6,428 ft. It is drilling below 6,492 ft. in lime. F. P. Cullum 2-B Stine, southeast outpost to the Stine Bend conglomerate pool, took a 1-hour drill-stem test from 5,565-5,607 ft., total depth. Gas came to the surface in 4 minutes and 350 ft. of oil was recovered. Operator is preparing to acidize.

Pure Oil Co. 1 Little, wildcat 2 miles southwest of Gordonville, Grayson County, is dry at 9,919 ft. in Ellenburger topped at 9,420 ft. Mid-Continent 1 Tom L. Burnett, wildcat 6 miles north of the Johnson pool in Foard County, is drilling below 5,346 ft. in shale and lime. Continental Oil Co. has staked a new 6,000-ft. wildcat in northeastern Jack County, 9 miles southeast of Newport in Clay County. It is 1 S. F. Borden, 990 ft. from the north and west lines of the E. S. Wilson Survey.

NORTH CENTRAL TEXAS WILDCAT FAILURES

Archer County: Delbar 1 C. L. Abercrombie, Blk. 153, John W. Harris subd., 2½ mi. SW Archer City, elev. 1,043 ft., dry, TD 1,240 ft.

Clay County: Continental 1 W. M. Hillin, Blk. 3290, TE&L Sur., 4 mi. SW Bellevue, elev. 1,043 ft., Barnett 6,290 ft., Simpson 6,572 ft., Ellenburger 6,658 ft., dry, TD 6,821 ft.

Cooke County: Texas 1 Morris, M. Wilkerson Sur. A-1124, 7 mi. SE Gainesville, elev. 840 ft., dry, TD 4,987 ft.

Nu-Enamel 1 J. T. Biffle, A. J. Miller Sur. A-635, 2 mi. SE Myra, elev. 867 ft., Detrital 1,750 ft., dry, TD 2,120 ft.

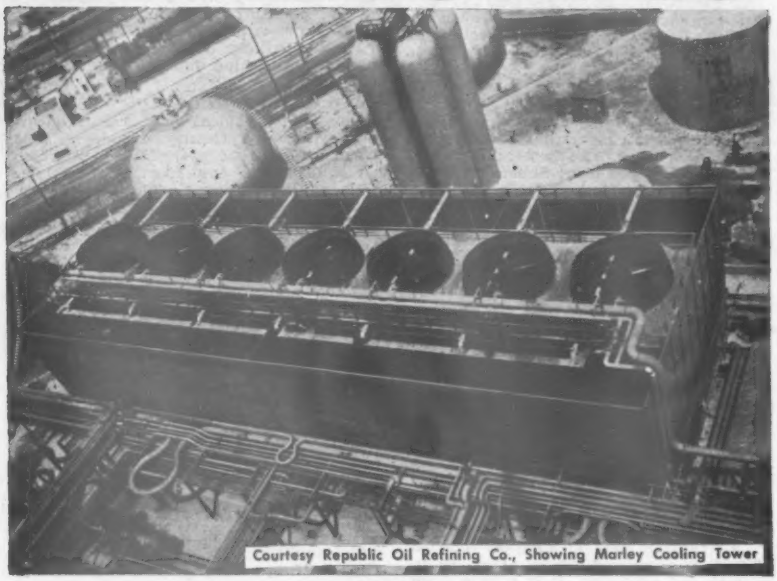
Texas 1 Sowder, Thos. Toby Sur. A-1044, 6 mi. SW Muenster, elev. 1,076 ft., dry in granite, TD 4,122 ft.

Montague County: Fisher & Buckingham 1 T. R. Copeland, N. Kimbro Sur. A-405, 4 mi. NE Stoneburg, dry, TD 700 ft.

WEST CENTRAL TEXAS WILDCAT FAILURE

Mills County: M. M. Miller et al 1 Geo. Nieman, James A. Winn Sur., 12 mi. NE Goldthwaite, elev. 1,563 ft., Ellenburger 3,585 ft., dry, TD 3,630 ft.

HAERING GLUCOSATES



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LA.-ARK.

New Haynesville Well Makes 121 Bbl. Per Day

MAGNOLIA.—Midstates Oil Co. has a new producer in the Haynesville field in 1 Taylor-Partee-Wilson unit, 349 ft. south and 474 ft. northeast of center of SW SW 34-19-20w, in Columbia County. The well made 121 bbl. in 24 hours through a 10/64-in. choke from 5,520-31 ft., after acidizing with 5,000 gal. Tubing pressure was 650 lb., and casing pressure 1,550 lb. Also in Columbia County, Mayfield Drilling Co. 1 Woodward, SE NE 6-17-18w, has tested 15 stands of oil and three stands of salt water after drilling to 7,515 ft.

In Bossier Parish, La., Barnsdall Oil Co. and Sohio Oil Co. 1 Welori Lumber Co., SE NW 20-20n-12e, 1½ miles southeast of Benton field, drill-stem tested in the Bodcaw sand at 8,208-42 ft. Recovery was the water cushion, 60 ft. of gas-cut mud, and salt water. Operators will core ahead. In Sabine Parish, Panhandle Refining Co. 1 Whitney Corp., a wildcat in 29-10n-14w, had a total depth of 6,853 ft. and set pipe. Operators will test three shows, with the section at 5,190-5,200 ft. showing gas and distillates.

NORTH LOUISIANA WILDCAT FAILURE

Tensas Parish: Carter 1 Butts, 660 ft. south and 270 ft. west of NE cor. of NE SW 14-10n-10e, dry, TD 9,108 ft.

ARKANSAS WILDCAT FAILURES

Columbia County: G. H. Vaughn 1 McKissick, SE SE 18-16s-21w, dry, TD 7,852 ft.

Drew County: Curtis Kinard 1 Deal, NW SE 29-11s-7w, dry, TD 4,386 ft.

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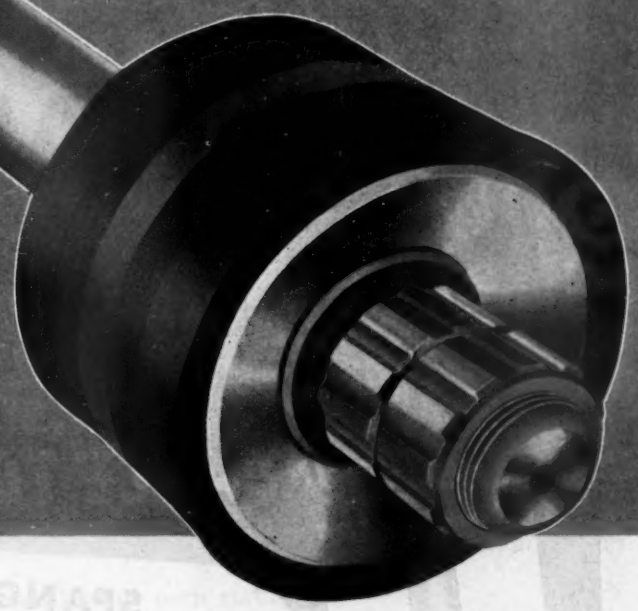

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5A–7

Washington County: Plymouth Oil 1 Spies, SW SW SW 24-13n-30w, dry, TD 2,121 ft.

Plymouth Oil 1 Williams, 990 ft. north and 330 ft. east of SW cor. 24-13n-30w, dry, TD 1,245 ft.

MICHIGAN

Ten Wildcat Completions Get Poor Results

SAGINAW.—In the year's most active week, Michigan operators in oil and gas fields reported 23 completions—6 resulting in oil wells, 4 in natural-gas producers, while 13 others were dry holes.

Activity featured wildcatting particularly, but results again were disappointing, only one of 10 such operations showing any promise at all. That was a test in Huron County, part of an extensive exploration by Shell Oil Co., Inc. in the Michigan "Thumb" area. This test, in Elmwood Township, Tuscola County, was pumping 3 bbl. a day, with salt water..

Arenac County's Deep River pool produced another gusher that came in at nearly 200 bbl. an hour and another successful well was reported from the expanding Coldwater field in Isabella County. The three other producers were relatively small wells.

That the increased activity will continue was indicated by state conservation department reports showing 18 new drilling permits last week with Sohio Petroleum Co. accounting for five of them with new wells planned in the Coldwater field. Three other locations are listed for Ottawa County, two each for Montcalm and Arenac, three for Newaygo, one each for Gladwin, Allegan and Van Buren.

MICHIGAN SUCCESSFUL WILDCAT

Tuscola County, Elmwood Township: Shell Oil Co. 1 Hutchinson, NE NE NW 21-14n-10e, pumping 3 bbl. oil and salt water, acidized, TD 3,945 ft.

MICHIGAN WILDCAT FAILURES

Clinton County, Essex Township: Union Developing & Producing Co. 1 Piggott, SE SE SW 30-6n-3w, dry in Sylvania, TD 3,925 ft.

Lebanon Township: Smith Petroleum Co. 1 Kellam, SW NE NE 33-8n-4w, dry in Dundee, TD 3,000 ft.

Huron County, Dwight Township: Charles W. Teater 1 Polega, SE NE SE 27-18n-13e, dry in Sylvania, TD 3,856 ft.

Kalamazoo County, Texas Township: Stuart Godfrey 1 Stuart & Clark, NE SW SE 34-3s-12w, dry in Traverse, TD 1,287 ft.

Kent County, Cascade Township: Fisher-McCall Oil & Gas Co., Inc. 1 Eardley, SE SE SE 32-6n-10w, dry in Traverse, TD 1,994 ft.

Mecosta County, Millbrook Township: C. W. Collin 1 Fountain, NE SW SW 4-13n-7w, dry in Monroe, TD 3,895 ft.

Muskegon County, Holton Township: Muskegon Development Co. 1 Richards, SW NW NE 10-12n-15w, dry, TD 1,239 ft.

Newaygo County, Denver Township: E. L. Bourret 1 Booher, NE SE SE 8-14n-14w, dry in Dundee, TD 2,241 ft.

Van Buren County, Geneva Township: Socony-Vacuum Oil Co., Inc. 1 Kuzmka, SE NE SE 22-1s-16w, dry in Traverse, TD 1,088 ft.

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APPALACHIAN FIELD

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PITTSBURGH.—In southwest Pennsylvania, the test of Charles E. Young et al on George B. Ecroyd farm in North Strabane Township, Washington County, appears larger than indicated last week. The corrected record places the Gantz sand at 2,395-2,438 ft. with about 40,000 cu. ft. of gas at 2,412 ft., Gordon sand 2,660 ft. with about 100 bbl. of oil at 2,678-84 ft., total depth 2,692 ft.

In West Virginia, the second test of Columbian Carbon Co. on Gauley Mountain Coal Co. in Falls district, Fayette County, reported as gaging 1,770,000 cu. ft. gas from the Big Lime topped at 1,422 ft. and bottomed at 1,615 ft., was acidiized with 1,000 gal. which resulted in a final open flow of 6,115,000 cu. ft.

In Barbour County, Hope Natural Gas Co. extended the pool in Elk district with completion of 8,899 J. H. Dickinson in the Benson sand at a total depth of 4,335 ft. and a final open flow of 1,225,000 cu. ft. gas.

In Wetzel County, Hope Natural Gas Co. completed a test on C. E. Brown farm in Center district with a gage of 1,128,000 cu. ft. gas from the Injun sand, total depth 2,053 ft.

In Jackson County, Columbian Carbon Co. topped the Corniferous lime at 4,848 ft. in test 782 on V. M. Rhodes farm and set casing at 4,958 ft. before drilling through the lime into the Oriskany.

In Tucker County, Ohio Oil Co. has resumed drilling the wildcat on Kuykendall Unit on Blackwater Anticline in Dry Fork district, using a rotary. Cable tools reached 3,900 ft.

In southeast Ohio, Ohio Oil Co. has started two wildcats to test the Oriskany

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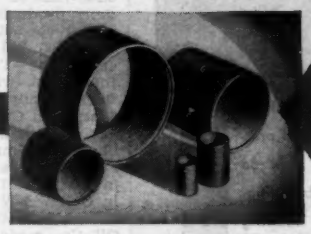

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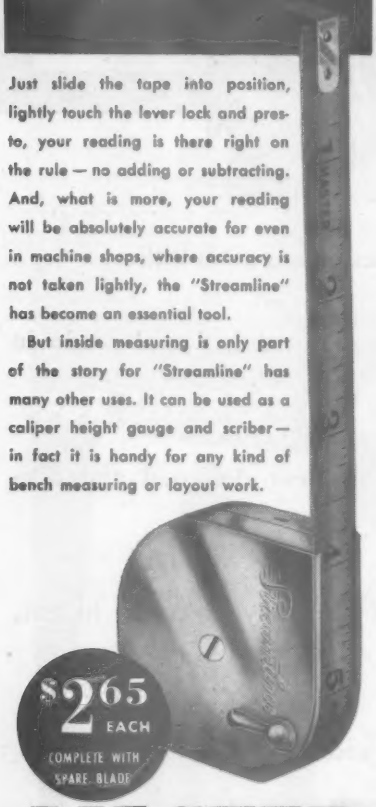

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sand, about 6 miles northeast of the discovery well in Knox Township, Columbiana County. The new locations are both in Mahoning County, one on Warren Waring in Section 13, Smith Township, and the other on D. B. McCune farm in Section 12, Goshen Township.

OKLAHOMA

West Edmond and Bethany Drawn Closer Together

MAGNOLIA Petroleum Co. extended the West Edmond field one-half mile south with 1 Whetstone, C NW SE 33-13n-4w, Oklahoma County, Oklahoma, which produced 567 bbl. of oil in 3 hours through 1-in. choke, after ridding itself of the acid load, the production coming from Bois D'Arc lime at 6,969-7,040 ft., total depth 7,090 ft. Seven-inch casing was set at 7,076 ft. and 130 perforations were made at 6,990-7,035 ft. The well showed a potential daily production of 6,000,000 cu. ft. of gas. The recorded three hourly flows of oil were 195 bbl., 190 bbl. and 182 bbl. respectively. The well is 4 mi. north and then 1 mi. west of the discovery well of the Bethany area, Phillips & Kerlyn 1 Classen in C NW SE 22-12n-4w, which is a gas and distillate producer, and locations have been made between the two wells. Following the locations made by Phillips in Section 8-12-4w, Max Cohn staked one in C NW NW 14-12n-4w.

Earlier in the week Anderson-Prichard Oil Co. made a northwesterly extension of ¾ mile in the Kingfisher County end of the West Edmond field. No. 1 Stewart, C NW NW 24-15n-5w, made an initial showing of 141 bbl. of fluid, a small percentage of which was water, in 22 hours, from Bois D'Arc lime at 7,014-26 ft. This well and Magnolia's extension well in 33-13n-4w, make the West Edmond pool over 14 miles long.

In efforts to extend the West Edmond field northerly Phillips Petroleum Co. and Carter Oil Co. have made location for two wells in Kingfisher County. No. 1 Jarick is in C SW SW 26-16n-5w and 1 R. A. Hoffman, C NE NW 12-15n-5w, the latter location being 2 miles north of production in the Kingfisher end of the pool and 2 miles northwest of Phillips-Carter 1 Dublin, in 12-15n-4w in Logan County, a dry hole.

Several Pottawatomie County wildcats were nearing the completion stage including Ashland Oil & Refining Co. 1 Loman, NE SW SW 9-9n-4e, northeast of Shawnee; Stanolind Oil & Gas Co. 1 et al 1 Teas, NE SE SW 1-10n-4e, in the East Tecumseh area; F. C. Miller 2 Haer, NW NE SE 31-10n-5e, north of Earlsboro and KGFF Oil Co. 1 Bourbannais, C NW SW 31-10n-4e, near Lake Tecumseh.

Of the five discovery wells listed below among the wildcat completions two opened pools with initial production large enough to give the new pools importance. These were Phillips Petroleum Co. 1 Gipson in Marshall County and Kerlyn Oil Co. 1 Bourassa in Pottawatomie County. Pittsburg County was given a new gas area by Public Service Co. 1 Travis in 5-7n-14e.

OKLAHOMA SUCCESSFUL WILDCATS

Creek County: New oil pool—Glen Cole et al 1 Parks, SW SW NE 15-16n-10e, pumped 20 bbl. of oil from lime and Dutcher at 2,647-66 ft., TD 2,666 ft., Layton 850 ft., Red Fork 1,954 ft., Dutcher 2,652 ft.

Marshall County: New oil pool—Phillips et al 1 Gipson, SE SE NE 10-6s-6e, flowed 296 bbl. in 36 hours through ¼-in. choke, from 3,375-3,400 ft., gravity 37.7°, TD 3,482 ft., first Bromide 3,061 ft., second Bromide 3,171 ft., third Bromide 3,346 ft.

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Pittsburg County: New gas pool—Public Service 1 Travis, NW NE 5-7n-14e, flowed 1,400,000 cu. ft. gas from sand at 1,850-1,925 ft., TD 1,987 ft.

Pottawatomie County: New gas pool—Cities Service 1 Hoffman, SE NE NE 34-6n-3e, flowed 3,660,000 cu. ft. gas from sand at 3,399-3,473 ft., Layton 2,673 ft., Woodford 3,500 ft., Hunton 3,637 ft., TD 3,640 ft.

New oil pool—Kerlyn 1 Bourassa, NW NE SE 21-6n-3e, pumped 165 bbl. in 24 hours from dolomite at 4,116-26 ft., TD 4,397 ft., Woodford 3,740 ft., Sylvan 3,890 ft., Viola 3,977 ft., dolomite 4,116 ft., second Wilcox 4,260 ft.

Tillman County: New oil pool—Texas 1 Smith, E/2 NW NW SE 36-2s-18w, pumped 6 bbl. oil and 27 bbl. water in 8 hours from Canyon at 2,990-3,070 ft., TD 5,428 ft., Strawn 3,800 ft., Chimney Hill 4,820 ft., Sylvan 4,835 ft., Viola 4,895 ft., Simpson 5,045 ft., Arbuckle 5,370 ft.

OKLAHOMA WILDCAT FAILURES

Garfield County: Herndon 1 Moore, NW NW SE 14-23n-3w, dry, TD 4,831 ft., second Wilcox 4,811 ft.

W. E. Anderson 1 Braithwaite, NW NW NE 8-20n-3w, dry, TD 4,601 ft., Layton 4,515 ft.

Garvin County: Sinclair Prairie 1 Ackerman, NW SE SE 16-3n-3e, dry, TD 2,400 ft., base Bromide 1,844 ft.

Pittsburgh County: Public Service 1 Rabke, SE SW 27-7n-12e, dry, TD 1,517 ft.

Pottawatomie County: Wood Oil et al 1 McPherson, SE NW NE 9-6n-3e, dry, TD 4,212 ft., Woodford 4,195 ft.

Stephens County: T. H. McCasland 1 Mitchell, NE NE NW 22-1n-9w, dry, TD 2,600 ft., Arbuckle 2,547 ft.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, Washington, D. C. Notice is hereby given that the lands herein described within the known geologic structure of the Iron Creek Oil Field, Wyoming, are offered to qualified bidders of the highest cash amounts offered per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act as amended by the act of August 21, 1935 (49 Stat. 674, 30 U. S. sec. 226) in the following parcels all in T. 32 N., R. 82 W., 6th P. M.: Parcel No. 1, NW¼SW¼ sec. 2, SE¼SE¼ sec. 3, 80 acres. Parcel No. 2, N½SE¼, SW¼-SE¼ sec. 3, W½NE¼ sec. 10, 200 acres. Parcel No. 3, W½SE¼ sec. 11, 80 acres. A stipulation for the protection of the Kendrick Reclamation project, a copy of which may be obtained from the local office at Cheyenne, or the General Land Office, Washington, D. C., will be made a part of any lease covering the W½SE¼ sec. 11. Sealed bids will be received in the office of the Commissioner of the General Land Office, Interior Department Building, Washington 25, D. C., up to 12 noon May 31, 1945. Each bidder must submit a certified check or cash for one-fifth of the amount bid, payable to the order of the Treasurer of the United States and file the showing of qualifications to receive a lease required by section 7 of Circular 1386. The remainder of the bonus and the annual rental at the rate of $1.00 per acre must be paid and a $5,000 corporate surety bond must be furnished by the successful bidders prior to the issuance of the leases. The deposits of the other bidders will be returned upon acceptance of the successful bids by the Secretary of the Interior. The envelopes should be plainly marked "Bid for Parcel No. ——, Iron Creek Field. Not to be opened before noon May 31, 1945." No bids received after the hour fixed herein for submitting bids will be considered. The successful bidder will be required to agree not to discriminate against any employee or applicant for employment because of race, creed, color, or national origin, and to require an identical provision to be included in all subcontracts. Bidders are warned against violation of section 59, U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. Fred W. Johnson, Commissioner.

WILDCAT COMPLETIONS AND DISCOVERIES

	Week ended May 12, 1945					Cumulative total, 1945				
	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
Ohio	0	0	1	1	2	0	0	7	25	32
Indiana	0	0	0	0	0	2	0	0	7	9
Illinois	0	0	0	2	2	16	0	0	87	103
Kentucky	1	0	0	0	1	3	0	1	14	18
Michigan	1	0	0	9	10	3	0	1	88	92
Kansas	1	0	0	7	8	14	0	6	116	136
Neb., Mo., Iowa	0	0	0	0	0	0	0	0	9	9
Oklahoma	4	0	2	6	12	35	0	6	104	145
Texas:										
North Central	0	0	0	7	7	35	0	3	170	208
West	0	0	0	4	4	24	0	0	110	134
Panhandle	0	0	0	0	0	0	0	1	4	5
Eastern	0	0	0	2	2	5	2	0	33	40
Gulf Coast	0	0	1	3	4	22	1	12	91	127
Southwest	0	0	0	6	6	9	1	3	63	76
Total Texas	0	0	1	22	23	95	5	19	471	590
Louisiana:										
Northern	0	0	0	1	1	1	1	2	24	28
Southern	1	0	0	1	2	12	0	0	17	29
Total Louisiana	1	0	0	2	3	13	1	2	41	57
Arkansas	0	0	0	4	4	0	0	0	19	19
Mississippi	0	0	0	0	0	3	0	0	42	45
Ala., Ga., Florida	0	0	0	1	1	0	0	1	9	10
Montana	0	0	0	1	1	5	0	0	8	13
Wyoming	0	0	0	0	0	8	0	0	14	22
Colorado-Utah	0	0	0	0	0	0	0	0	3	3
New Mexico	1	0	0	2	3	6	0	2	25	33
California	0	0	0	2	2	1	0	2	73	76
Total United States	9	0	4	59	72	204	6	47	1,155	1,412
Total previous week	7	0	1	73	81					

CANADIAN FIELDS

Ram River Devonian Test Looks Good

CHATHAM.—Good indications of production in the Devonian limestone have been encountered in Ram River Oils 3, LSD 12, 1-37-11w5, on the Ram River-Clearwater structure in the northern Alberta foothills. Drilling was discontinued at 5,598 ft. after drilling several hundred feet of Dawonian limestone in which considerable porosity was encountered. Water intrusion from an upper horizon is being shut off preparatory to testing. Production from the Devonian limestone is a light crude. Location for Ram River 4 has been made in LSD 9, 36-34-10w4, 2 miles south and 6 miles east of No. 3.

Conrad.—In the Conrad field, southern Alberta, Mid-Continent-East Crest 3, LSD 1, 8-6-15w4, has been abandoned at 3,180 ft., after failing to get commercial production in the Ellis sand. Mid-Continent-East Crest 4 has been spotted farther north, in LSD 8.

MISSISSIPPI

New Production Zone Found in Eucutta Pool

JACKSON.—A new zone of production has been established in the Eucutta pool of Wayne County by the Gulf Oil Co. 1 Davis, NW SW 2-9n-9w. Successful drill-stem tests were taken in the City Bank and upper Stanley zones, although the pool usually produces from the Tuscaloosa. A drill-stem test was taken in the City Bank zone at 5,165-78 ft., and recovery was 1,250 ft. of 33.3° gravity oil in 14 minutes. The Stanley was drill-stem tested at 5,244-61 ft., and recovery was 1,360 ft. of 30.6° gravity oil in 12 minutes. Schlumberger was run to 5,273 ft., and indicated the oil-water contact at 5,266 ft., or —4,956 ft.

In Collier County, Florida, the Humble Oil & Refining 4 Gulf Coast Realty Co., 1,996 ft. south and 2,054 ft. west of NE corner of Section 20-48s-30e, has had a successful drill-stem test after one failure. This well is located 8,000 ft. north of the Humble discovery of the Sunniland field. An attempted drill-stem test at 11,556-86 ft. failed, then porous saturated lime was cored at 11,588-97 ft. Drill-stem test was run at 11,549-97 ft., which recovered 5,500 ft. of 19.2° oil in 1 hour and 36 minutes, with just a trace of salt water.

FLORIDA WILDCAT FAILURE

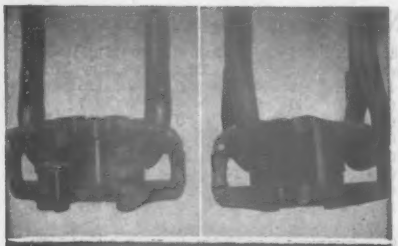
Gulf County: Pure 1 Gaskin, 585 ft. south and 381 ft. east of NW cor. of NE NW 19-5s-9w, dry, TD 5,606 ft.

Crude Price Increases for Some Wyoming Fields

Effective May 1, 1945, the Sinclair Wyoming Oil Co. announced new price schedules for sour crude from the Big Sand Draw, Lost Soldier-Tensleep, Wertz, and Mahoney Dome fields in Wyoming. The new prices start with 70 cents per barrel for crude below 20 gravity, with a 2-cent differential per degree to a top of $1.12 per barrel for 40 gravity and above. This is an increase of 12 cents per barrel and increases the crudes involved to parity with West Texas sour oils.

Revised Spacing Rule

CHICAGO.—The previous spacing pattern for the Ray West field, Norton County, Kansas, was revoked, and a new optional program established, effective May 8, calling for 40-acre spacing with locations in either the northwest or southeast quarter of a quarter-quarter section.



In Either Open or Closed Position

BJ "AA" ELEVATORS ARE REALLY BALANCED

By incorporating a newly devised roller type balancing cam in BJ "AA" Elevators the work of the derrick man is made much easier. Rated at 300 tons, with a safety factor of four to one, this elevator is made of high alloy steel—fully heat treated—flame hardened on the top bore to minimize upsetting—and is equipped with an unusually sturdy latch. Ask the BJ man or your supplier.

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PROVED IN PEACE—IN WAR

'BESTOLIFE Lead Seal Joint Compound has been used successfully in the Oil and Refining industries for the past fifteen years. During that time, it has proved itself superior in protecting threads and in providing tight joints which can be broken easily.

Today, 'BESTOLIFE has enlisted in the Navy, Merchant Marine and Defense Plants for the duration, and we are proud of this assignment to help in the Victory effort.

But there are still ample stocks of 'BESTOLIFE available on any priority rating, at supply house field stores in every drilling district in the United States and Canada. Use 'BESTOLIFE Tool Joint Compounds for best results!

EXPORT: THE NATIONAL SUPPLY CORP., 30 ROCKEFELLER PLAZA, NEW YORK

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LOS ANGELES 1, CALIFORNIA

Among the

Drilling Contractors

Robert W. Jones is the drilling contractor on the Harris Oil Co. and Del Fortney 1 Effie M. Sutter, in SW SW SW 35-3n-13w, Allegan County, Michigan.

Hutchings Drilling Co. was rigging up to begin a 4,000-ft. test for A. W. Hutchings-Healy Co., at the 1 Mary Wadlington Co., in C SW NE 18-12n-1e, Marengo County, Alabama.

Hissom Drilling Co., contractor on the Stanolind Oil & Gas Co. 1 Zantz, in SW SW SW 29-29-18w, Kiowa County, Kansas, was drilling below 4,953 ft. This is a wildcat test in the south part of the county approximately 8 miles south of the town of Greensburg.

C. W. Ramsey will drill the Ray C. Andres 1 Elmo S. and Marie Nobles, in SW NE NE 15-8n-14w, Ottawa County, Michigan.

T. J. Conway Drilling Co. was moving in rig to start its contract to drill the Sinclair Wyoming Oil Co. 1 May Morrison, in 12-1n-12e, Jasper County, Mississippi.

Higgenbotham & King are contractors on the H. E. Walton and William B. Stewart 2 Tony Kocot, in SE NE NE 16-19n-4e, Arenac County, Michigan.

Parker Drilling Co. is contractor on the Humble Oil & Refining Co. 1 Denkmann Lumber Co., in C NW SE 27-9n-19w, Jefferson Davis County, Mississippi.

American Drilling Co. will drill the M. E. Holloway 1 Annis Lesney Badge, in NW NW SE 23-19n-4e, Arenac County, Michigan.

Kiowa Drilling Co. tools will drill the Derby Oil Co. and Kiowa Drilling Co. 1 Boxberger, in SW corner 33-13-14w, Russell County, Kansas. Test is located between the Russell and Williamson pools, approximately ¾ mile from production. Kiowa also has the contract on The Texas Co. 1 Crissman, in SW SW NE 11-24-20, Edwards County, Kansas.

R. & S. Drilling Co. has been awarded drilling contract on the Sohio Petroleum Co. 1 Gas Unit Comm., in C NW 32-16n-6w, Isabella County, Michigan.

Fisher Drilling Co. was preparing to spud in the Pan-American Production Co. 1 U.S.A., in 26-5n-6e, Scott County, Mississippi.

Virginia Drilling Co. tools will be used in drilling the J. M. Huber Corp. and Virginia Drilling Co. 1 Freeman, wildcat location in SW SE NW 27-21-12w, Stafford County, Kansas. Location is ¾ mile northeast of the Stittner pool production.

Andrew S. Hoyt is contractor on the P. K. Degenther 1 Jennie Boerman, in NW SW NW 35-5n-14w, Ottawa County, Michigan.

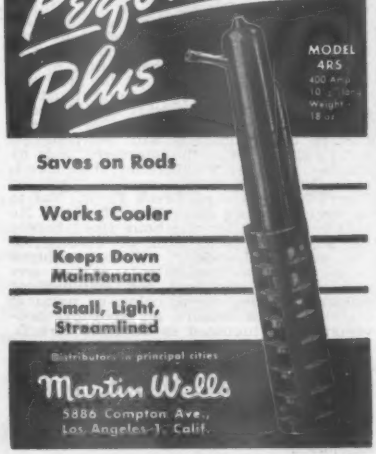
R. L. Johnson is the contractor in the Capital Oil & Gas Co. 1 Mrs. Ethel Gholston et al, in 18-14n-22e, Bullock County, Alabama. Test was drilling at 150 ft. in shale.

Iron Drilling Co. has the drilling contract on the Stanolind Oil & Gas Co. 1 R. E. Adams, in SW SW SW 7-35-29w, Meade County, Kansas. Test has been staked 5 miles east of the new gas discovery well at 1 A. Adams and on the same block.

Bender Drilling Co., Bakersfield, Calif., has been acquired by Ralph M. Parsons Co., Engineers and Con-

Electrode Holder Gives

Performance Plus



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Drill fast with minimum of weight, and minimum torque.
15 degrees bottom roller action to center of hole.
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See Composite Catalog—Literature and Prices upon request.

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UNIBOLT Couplings with their three interlocking shelves, or 3-point suspension, employ a proven principle and thus assure equal distribution of pressure on the seal ring.

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when you must replace rope now, ask your supplier for TUBBS—always reliable!

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Allied Supply Co., Los Angeles
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Hickey Pipe & Supply Co., Los Angeles

structors, of Los Angeles. Oil-well drilling equipment, yard, office, repair and fabricating shops, and other physical assets were included in the transaction. Parsons is retaining the entire field and office organization of approximately 125 men, together with the personal services of E. A. Bender and consultant. The company's plans call for continued drilling with existing equipment in San Joaquin Valley, and the addition of heavier rigs for use there and in other localities. F. L. Shepherd will be in charge of Bakersfield operations. C. V. Robinson will be responsible for all drilling, field, yard, and shop operations, and G. B. Taylor will be in charge of office operations.

Gifford C. Parker, Tulsa drilling contractor, recently returned from Eastern Venezuela, where he is supervising the drilling operations of Atlantic Refining Co.

Crescent Drilling Co. was waiting on rig to start its contract on the Carter Oil Co. 1 Dewey D. Swor, in C SW NE NE 15-4n-5e, Rankin County, Mississippi.

Midwestern Drillers, Tulsa, has recently finished a well and is moving to another location in a program of drilling seven or more wells for Columbian Carbon Co., in the Hugoton, Kans., area. This work is part of a 15-well program planned by Columbian. For Kuhn Oil & Gas Co., Midwestern Drillers are drilling near Ulysses, Kans., in a three-well program.

Lupher Drilling Co. has been awarded drilling contracts on four wells for Sohio Petroleum Co. in Isabella County, Michigan. The tests are the 2 Walter Sisco et al, in C N½ SW SE 28-16n-6w; the 2 Oscar Dague, in C N½ NE SE 30-16n-6w; the 1 Clarence H. Durkee, in C N½ NE NE 31-16n-6w, and the 1 Floyd Sisco et al, in C N½ NE NE 33-16n-6w.

CALENDAR

June

American Gas Association Southwest Personnel Conference, ninth meeting, Washington - Youree Hotel, Shreveport, June 5.

American Gas Association Midwest Personnel Conference, Phillips Hotel, Kansas City, June 7.

Interstate Oil Compact Commission, executive committee meeting, Oklahoma City, June 15-16.

Canadian Gas Association, annual convention, Manoir Richelieu Hotel, Murray Bay, Quebec, June 19-22.

October

Texas Mid-Continent Oil and Gas Association, Rice Hotel, Houston, October 4-6.

I.P.A.A., annual membership meeting, convention city to be selected later, October 15, 16 and 17.

PENBERTHY
"REFLEX"
WATER GAGE SET

For oil field, locomotive type and marine boilers. Water shows black — steam shows white; the water level is unmistakable. U-Bolt construction is strongest and simplest to service. Glass replaced by simply removing nuts on face of gage . . . unnecessary to work between gage and boiler. Conforms with A.S.M.E., Federal and State requirements when used for pressures specified by their respective codes.

This is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

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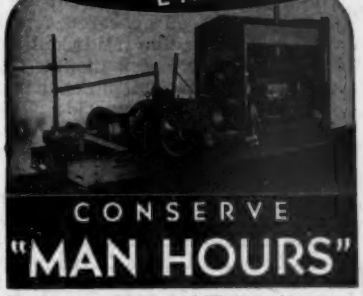
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

YOUNG DRILLING ENGINES



CONSERVE "MAN HOURS"

Moving — setting up — drilling — wherever a crew is working with a YOUNG Drilling Engine, you save time. That fact has been well established. Your own figures can quickly prove it. The reason for it is quite simple—unit design, skid mounting, simple control with no gears to shift or brake to set, ample power and speed. You get them all in this field-engineered, performance proved engine.

YOUNG ENGINES MAKE YOUR DRILLING DOLLARS GO DEEPER
GAS • DIESEL • GASOLINE

YOUNG ENGINE CORP.
CANTON OHIO

A. E. Avers, P. O. Box 606, Tulsa, Oklahoma
Iverson Tool Co., Texas, Artesia, New Mexico
Branchland Pipe & Supply Co., Huntington, W. Va.
Connelly Machy. Co., Billings & Great Falls, Mont.

OTHER YOUNG PRODUCTS
Natural Gas Carburetors • Orifice Gas Well Testers
Under-Road Boring Machines • Electric Light Plants

PERSONALS

Made a Reputation In Secondary Recovery

MILLARD H. FLOOD, recently advanced to division petroleum engineer at Marshall, Ill., for The Ohio Oil Co., has become particularly well known through his work in secondary recovery. After getting his initial technical training at Oklahoma A. & M. College, he took a temporary position with a bank in Tulsa, but kept an eye out for a job in oil. It soon appeared, and he went to work for Mid-Continent Petroleum Corp. A few months later he joined the production department of Tidal Oil Co., now Tide Water Associated Oil Co. Here he soon was specializing in secondary-recovery problems.

In 1930 Flood became consulting engineer on the Haynesville repressuring project in Louisiana. He was transferred to Illinois 2 years later to do secondary-recovery work in old oil fields. He continued in this branch of oil production 2 years, when he was moved up to his present post.

Flood was born in Shawnee, Okla. He likes golf, but does no bragging about his scores, and he goes quail hunting when he has a chance.

David E. Day, formerly assistant manager of manufacturing and pipe lines for Richfield Oil Corp., has been elected vice president in charge of manufacturing and pipe lines. He joined Richfield in 1923.

C. C. Anderson, engineer in charge of the Bureau of Mines, Exell, Tex., helium plant, has been appointed assistant chief of the Petroleum and Natural Gas Division at Washington. The announcement was made by **Dr. R. R. Sayers,** bureau director. Anderson replaces **H. C. Fowler,** recently named supervising engineer of the bureau's Petroleum Experiment Station at Bartlesville, Okla.

Garland H. B. Davis, director of the research division of Standard Oil Development Co.'s Esso Laboratories, has been appointed to the specialists group of Standard Oil Co. of New Jersey. He will be in charge of sales research and engineering. **E. Duer Reeves** succeeds Davis as research division director, and **Dr. F. L. Miller** becomes associate director. **Dr. Carl O. Tongberg** and **Dr. Stewart C. Fulton** were named assistant directors in the research division.

G. B. H. DAVIS

E. DUER REEVES

DR. F. L. MILLER

DR. C. TONGBERG

DR. S. C. FULTON

Dr. Robert E. Wilson, chairman of the board of Standard Oil Co. (Indiana), was elected a member of the board of directors of the Chase National Bank May 9. Dr. Wilson has received the Perkin Medal for outstanding work in applied chemistry.

A. H. Mitchell, manager of the personnel and industrial relations department of Carter Oil Co., Tulsa, last week was elected a director of the company. **W. M. Barnhill,** assistant treasurer of the company, was elected treasurer, succeeding **C. D. Mill,** New York City.

C. C. Michel has joined Acid Engineering Co. as assistant manager and coowner. He will have direct charge of the new treating station established at Edmond, Okla.

Joseph A. Sharpe has resigned as chief physicist of Stanolind Oil & Gas Co. to become vice president of C. H. Frost Gravimetric Surveys, Inc., Tulsa.

Eugene Holman, president of the Standard Oil Co. (New Jersey) will be honored by a dinner at Oklahoma City May 28, following his address to the graduates of the University of Oklahoma at Norman.

F. E. Patrick, field superintendent of Kuwait Oil Co., Ltd., is in the United States conferring with officials of Gulf Oil Corp. and Anglo-Iranian Oil Co., Ltd., joint owners of the Kuwait company. Patrick expects to return next month to Kuwait where plans have been completed for the resumption of activities in the field discovered by the Kuwait company and which was partially developed before operations were shut down due to the war. Patrick formerly was connected with the Louisiana and Texas field operations of the Gulf company.

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Owned and Managed by Texans
The BLACKSTONE
FORT WORTH'S HOTEL OF DISTINCTION
JOE T. O'KEEFE, President
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MARKET QUOTATIONS

Prices as of May 15, 1945

(This service is abbreviated because most refinery products are selling at the Government's price ceilings. Quotations on other products than those shown here furnished on request. Quotations are f.o.b. plant in tank cars and in cents per gallon.)

REFINERY GASOLINE

Octane (A.S.T.M.)	76†	70-74
Mid-Continent*	6.75	5.875
Gulf Coast	6.75	5.625
Northeast Coast	...	9.075
California	...	6.50-7.00

*Basic Oklahoma Group 3. †1939 C.F.R. (research method).

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	4.500	5.400
North Texas (f.o.b. plant)	4.125	4.950
North Louisiana (f.o.b. plant)	4.375	5.250
California	4.875	5.500

CRUDE-OIL PRICES

Representative posted schedules per bbl.	
East Texas	$1.25
Conroe	1.43
Tepetate, Louisiana	1.18
Illinois Basin	1.37
Pecos County, Texas	.95
Bradford, Pennsylvania	3.00
Van, Van Zandt County, Texas	1.08

Note: Exclusive of subsidy.

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Okla-homa Kansas	Gulf Coast Texas	West Tex.*
18-18.9	$0.80	....	....	....
19-19.9	.84	....	$1.06	$0.70
20-20.9	.88	$0.85	1.08	.72
21-21.9	.92	.87	1.10	.74
22-22.9	.96	.89	1.12	.76
23-23.9	1.00	.91	1.14	.78
24-24.9	1.03	.93	1.16	.80
25-25.9	1.07	.95	1.18	.82
26-26.9	1.11	.97	1.20	.84
27-27.9	1.15	.99	1.22	.86
28-28.9	1.18	1.01	1.24	.88
29-29.9	1.20	1.03	1.26	.90
30-30.9	1.23	1.05	1.28	.92
31-31.9	....	1.07	1.30	.94
32-32.9	....	1.09	1.32	.96
33-33.9	....	1.11	1.34	.98
34-34.9	....	1.13	1.36	1.00
35-35.9	....	1.15	1.38	1.02
36-36.9	....	1.17	1.40	1.04
37-37.9	....	1.19	1.42	1.06
38-38.9	....	1.21	1.44	1.08
39-39.9	....	1.23	1.46	1.10
40 and above	....	1.25	1.48	1.12

*Includes Lea County, New Mexico.

A.P.I. REFINERY REPORT

Week ended May 5, 1945

(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks — Gaso-line	Dis-tillate	Resid-ual
East Coast	747	13,734	5,910	5,709
Appalachian	161	3,713	459	345
Ill., Ind., Ky.	788	22,517	3,964	1,642
Okla., Kan., Mo.	376	9,308	1,847	1,175
Inland Texas	251	3,007	307	844
Tex. Gulf Coast	1,108	14,856	6,011	6,289
La. Gulf Coast	242	4,432	1,613	1,260
N. La., Ark.	78	2,822	738	234
Rocky Mtn.	115	2,435	305	638
California	910	14,517	7,646	21,387
Total 5- 5-45	4,786	*91,341	28,800	39,503
Total 4-28-45	4,780	94,068	28,273	39,813
Total 5- 6-44	4,348	88,186	30,356	50,543

*Military 41,620, civilian 49,721.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
May 5, 1945	221,019,000
April 28, 1945	223,474,000
May 6, 1944	234,166,000

*Excludes unrefinable California stocks.

ORBIT VALVES

MASTER VALVE WITH UNEQUAL FLANGES

The ORBIT GEAR OPERATED MASTER VALVE makes your Christmas Tree more compact by eliminating the use of an adapter flange—also eliminating chances for additional gasket leaks. The Unequal Flanges are cast integral with the body of the Valve.

Orbit Gear Operated Master Valve

This valve can be furnished thru all fabricators of Xmas Trees or thru any of your local supply stores at a price comparable to that of other leading valves, YET, this valve requires no lubrication to effect a seal.

See 1944 Composite Catalog

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All equipment is designed, manufactured and supervised by men who have had many years experience in steel plate construction.

TANKS BY BANKS

DALLAS TANK Company, Inc.

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Announcement!

J. I. BISHOP and L. H. LOCK,

formerly associated with

Black Construction Company
Mitchell-Stewart Construction Co.
Macpherson Construction Company

have withdrawn from predecessor firms and have organized

BISHOP & LOCK CONSTRUCTION CO.

Pipe Line Contractors

409 Magnolia Building — Riverside 6400

Dallas 1, Texas

TWENTY YEARS EXPERIENCE COMBINED WITH ORGANIZED, COMPETENT PERSONNEL AND MODERN EQUIPMENT QUALIFIES THEM FOR IMMEDIATE ACTIVITY IN CONSTRUCTION OR RE-CONDITIONING OF OIL, GAS OR GASOLINE PIPE LINES—THIS TYPE CONSTRUCTION WORK SOLICITED.

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NICK CARTER

B. L. LEASE

E. C. LOW

J. A. COMSTOCK

J. L. MULLIN

E. J. WHETZLE

Equipment Men in News

W. W. Runkle, since 1928 in charge of sales of Hazard Wire Rope Division, American Chain & Cable Co., in the Mid-Continent area, has been transferred from Fort Worth to Pittsburgh. Here, in addition to being district manager of Hazard, he will direct both wire-rope divisions of A. C. & C. in western Pennsylvania, Ohio, Kentucky, and West Virginia.

Harry L. Vines has been named director of sales for Tyson Bearing Corp., Massillon, Ohio. He was formerly western manager for R. G. LeTourneau, Inc., Stockton, Calif. Tyson also announces the appointment of **S. L. Huffman** as director of advertising, publicity, and public relations. He comes to the company from Timken Roller Bearing Co., where he was in charge of advertising for the steel and tube division and publicity manager. **Len Taylor,** previously program director for WHBC, in Canton, Ohio, has joined Tyson as assistant advertising manager. He will be primarily concerned with publicity and public relations.

C. O. Long, service engineer, oil-field-equipment division, The Guiberson Corp., has been transferred from Lubbock to Odessa, Tex. **Walter Butler** is in charge of the Odessa warehouse.

Nick Carter has been placed in charge of a new branch sales office Mid-Continent Supply Co., Fort Worth, Tex., has recently established in Wichita, Kans. The office is in the Union National Bank Building.

B. F. Lease has been elected president of Athey Truss Wheel Co., succeeding the late C. Kier Davis.

Ernest C. Low has been named vice president in charge of sales of John A. Roebling's Sons Co., Trenton, N. J. **Charles M. Jones** is now vice president in charge of Engineering, and **Archibald W. Brown,** treasurer, was elected board member.

John A. Comstock has been appointed director of research and metallurgy for all divisions of H. K. Porter Co., Inc., Pittsburgh.

J. L. Mullin has been advanced from general superintendent of foundries to vice president in charge of operations for American Manganese Steel Division of American Brake Shoe Co., with headquarters at Chicago Heights, Ill.

Edward J. Whetzle has recently been appointed advertising manager of International Derrick & Equipment Co., Columbus, Ohio, one of the Dresser Industries.

Dean D. Ault has joined the Westcott & Greis division of American Meter Co. as field engineer, with headquarters at Houston, Tex.

Henry D. Noll, petroleum engineer, has been appointed manager of the project analysis department of Houdry Process Corp., Wilmington, Del. Previously he was with Socony-Vacuum Oil Co., Inc., on wartime assignments.

Albert L. Bergstrom has been elected vice president of all engineering for Timken Roller Bearing Co., Canton, Ohio.

J. B. Ellzey has been promoted from store manager of Bethlehem Supply Co., at Houma, La., to district manager of the company's newly created Louisiana Gulf district. He will haye his office at the New Iberia, La., store, and will direct activities in the territories assigned to the Houma, New Iberia, and Lake Charles stores. **T. H. Salter,** formerly district manager for the entire area, will now be district manager for Southeast Louisiana district, with office at the Harvey store. Both districts are under general supervision of **C. C. Cruder,** Southern division manager.

Charles E. Young, former supervisor of economic research, has been appointed manager of the newly created statistical research department of Westinghouse Electric & Manufacturing Co.

J. Gordan Jackson has been promoted to chief engineer of all Eastman Oil Well Survey companies. He joined the organization in 1939.

Ross J. Lyons has been appointed California division manager of Kobe, Inc., to fill the vacacy created by the recent advancement of **W. F. Slater** to the position of manager of technical service. Lyons will headquarter in the Wilson Building, Huntington Park.

A recent meeting of Kobe, Inc., Mid-Continent personnel was attended by executives of both Kobe, from Huntington Park, Calif., and Dresser Industries, from Cleveland. Attending the meeting were, seated: H. W. Wilson, W. C. Gilmore, J. T. Langham, M. L. Walraven, Jr., of Kobe; J. B. O'Connor, executive vice president of Dresser; C. J. Coberly, Kobe president; A. R. Weis, vice president, and R. C. Kelley, director of purchases, Dresser; R. J. Lyons, Wayne Clark, H. K. Ihrig, of Kobe. Standing: V. T. Kirkhuff; J. T. Roberts; W. T. Petty; D. M. Dice; D. Scaramucci; E. O. Layman; R. A. Feemster; H. K. Browning, Kobe general sales manager; R. G. Ralph, division manager; J. T. Lewis; E. T. Harrison; C. E. Buchner; J. J. Prichard; C. E. Edwards, and R. F. Schooling

Classified Advertising

HELP WANTED

WANTED by consulting organization. Petroleum engineers with Hayward mud logging experience or its equivalent. Immediate openings in Venezuela, excellent opportunity for advancement to managerial positions throughout the world. Box A-290, The Oil and Gas Journal, Tulsa, Okla.

DRILLERS

Steady work, good wages, water wells year round, Bucyrus machines, essential to war effort, draft exempt. Apply — Gray Well Drilling Co., Inc., Box 161, Phone 1051, Delafield, Wisconsin.

ENGINEER capable of designing line of Centrifugal Pumps for refinery application. This engineer is required by a long established pump manufacturer. Excellent opportunity for right man. State experience, age, and salary desired. Write Box A-523, The Oil and Gas Journal, Tulsa, Oklahoma.

MAINTENANCE INSPECTOR for refinery located in Middle West. Must have cracking unit experience. Permanent position and excellent opportunity for competent man. State age, experience and salary desired. Box A-522, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED plane table engineer, would prefer personal interview. Laughlin-Simmons & Co., 615 Oklahoma Natural Gas Building. Phone 3-5985, Tulsa, Oklahoma.

ENGINEERS WANTED: Graduate Ch.E., M.E., or E.E., 20 to 29 years of age, having refinery or laboratory experience. Essential industry with post-war continuance. State education, experience, salary expected and date of availability. P.O. Box 2546, Houston 1, Texas.

MATERIAL MAN: Major oil company desires material man for foreign service, with thorough knowledge of the purchase, receipt, warehousing and accounting for oil field equipment. Reply Box 2819, Dallas 1, Texas, giving full details of education and experience.

WANTED: Chief Geologist. By a small, well-financed, independent Oil Company, operating Mid-Continent area. Permanent position with an opportunity for advancement. Will be permitted to purchase Royalties. Address Box A-524, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED

Metallurgist

Electrical Instrument Engineer

(preferably with E.E. degree)

Rockbit Designer

by one of largest oil tool manufacturers in Southern California. Specify which position you are applying for. Send complete data about yourself in first letter. Fine opening for right men. Salary open. Address Box A-531, The Oil and Gas Journal, Tulsa, Oklahoma.

MEN FOR FOREIGN EMPLOYMENT
in Saudi Arabia

Refinery operators; petroleum, electrical and mechanical engineers; radio operators and technicians; air-conditioning and refrigeration mechanics; stabilizer operators; welders (pressure-vessel-pipeline); stenographers; typists.

Employment offers opportunities for post-war security and advancement. Liberal benefit plans; vacations in United States; free hospital and medical care.

If genuinely interested in foreign career, send full information on experience, transcript of college record (professional applicants only), references, draft and availability status to our Employee Relations Department.

ARABIAN AMERICAN OIL COMPANY
100 Bush Street
San Francisco 4, California

HELP WANTED

WANTED: Laboratory tester capable of making routine tests on refined products including asphalt and road oils. State age, experience and education. Salary commensurate with experience. Location, Wyoming. W.M.C. rules apply. Box A-540, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED
DIRECTOR OF LABORATORY

By manufacturer of rust preventives and specialty petroleum products, recognized leader in its field. Location—Chicago. Should be available as soon as possible. Excellent postwar opportunity and attractive renumeration.

NOX-RUST CORPORATION
2429 S. Halsted St., Chicago 8.

WANTED
ENGINEERING
DRAFTSMEN
FOR PROCESS PIPING

Applicants must conform with Local War Manpower Regulations. State full details of training, experience, and availability in first letter.

THE STEARNS-ROGER MANUFACTURING CO
1720 California Street
Denver 2, Colorado

SITUATIONS WANTED

SUPERINTENDENT of Refinery, 20 years experience in Refinery Engineering, design, developing of processes and supervision. Desiring change, preferrably south. Box A-528, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE GEOLOGIST and Registered Civil Engineer, Age 39, experienced in supervision, design, field and construction engineering desires responsible position. Available on short notice. Box A-530, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE Petroleum Engineer, ten years experience, gas and condensate production, reservoir engineering, valuations, desires permanent position and salary commensurate with experience. Box A-534, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY SUPERINTENDENT or CONSTRUCTION SUPERINTENDENT. Graduate M. E. and E. E. 20 years' experience in large and small refineries in U. S. A., Europe and the Caribbean, would like to become connected with reliable Company. Thorough knowledge of various types of processing, distilling, cracking including coking, chemical and catalytic processes. Also design, calculations, construction of plants. Organization of management, labor. Evaluation of stocks, realization of products. Would carry out development of operating refineries or rebuild or construct and operate new ones. Will accept suitable position in North America or overseas. Speaks and writes five languages. Box A-537, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION Superintendent; 17 years' experience in development and exploitation. Engineering experience. Age 35. Available immediately. Box A-538, The Oil and Gas Journal, Tulsa, Oklahoma.

DESIGN, process, construction engineer thoroughly familiar operation. Available immediately, go anywhere. Have designed and built refineries. Can handle men. Salary desired $12,000. Box A-539, The Oil and Gas Journal, Tulsa, Oklahoma.

PATENT ATTORNEYS

PATENTS, Trade-Marks, Booklet, "General Information Concerning Inventions and Patents" and "Free Schedule" sent without obligation. Established 1915. Lancaster, Allwine & Rommel, Suite 418, Bowen Bldg. Washington 5, D. C.

ADDRESS WANTED

BILL PLUNKEET — Oil Driller — Please contact L. Pruiette at 518 Wood Street, Texarkana, Arkansas.

BUSINESS OPPORTUNITIES

FILTER CLAY: Alkali-earth sub-bentonite. Large surface deposit, no overburden. San Bernardino Co., Calif. For Sale or Lease by owner. Box A-535, The Oil and Gas Journal, Tulsa, Oklahoma.

EQUIPMENT FOR SALE

1—INGERSOLL Rand portable air compressor, 315 C.F.M. capacity on 4 steel wheels. Driven by Waukesha Motor. Equipped for Natural Gas or diesel fuel. A-1 Condition. SAPULPA TANK CO., P.O. Box 218, Sapulpa, Oklahoma.

FOR SALE: Model 200-R. T. Sullivan Core Drill. Current Model mounted on D246-F International Truck. 58 foot derrick, 5 x 8 Gardner-Denver Pump, powered by two 95 H.P. Motors. Complete with all drilling accessories for drilling to 2,000 feet. Write or wire Box 1193, Monahans, Texas.

FOR SALE: 2—Used 26" x 20" Clark Cylinders Complete. Cities Service Oil. Patridge, Bartlesville, Oklahoma.

FOR SALE: Two Waukesha Drilling engines, 180 H.P. equipped with gasoline starting motors. R. L. Melton, Seminole, Okla.

FOR SALE: 6x6x6x12 Ingersoll-Rand Compressor and 80 HP Bessemer Engine including belt, connections, coils, etc. Excellent condition. Near Bartlesville. Price $1650. Write 45 Oil Co., Bartlesville, Oklahoma.

ONE practically new Model FDM Franks Slim Hole or shallow production Portable Unitized Drilling Unit, mounted on large tandem truck, with all necessary drilling equipment, ready to put to work. Will sell for 80% of actual cost. Box 572, Odessa, Texas.

FOR SALE: 1—SC-12-A Oil Well Pump jack with weights, and 35 H.P. motor. 1—Lamtex 4" casing pump with 1600' ⅞ rods. 2—210 bbl. welded tanks, 1—10' x 18' cypress hay tank, 1—2" x 20 tube heater. Box A-532, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Type H-46 Emsco Hoist—9-14½ x 7¾ x 18" G. D. Pumps—12 x 12 G. D. Roller Bearing Twin Cylinder Engine, Large Hooks, Blocks and Miscellaneous steam equipment. H. D. BILES, Box 710, Fort Worth, Texas.

FOR SALE: Rotary Steam Drill Outfit—recently completed 9,300 ft. hole using 3½" Drill Pipe — good condition. NATIONAL SUPPLY CONSTRUCTION CORPORATION, Fort Worth, Texas.

SLUSH PUMP—New EMSCO Power Driven C 16 at Seminole. Call Freeman, Phone 4-3105, Tulsa, Oklahoma.

FOR SALE: The following brand new, first quality, plain end: 2,700' ¾" extra heavy butt weld; 2,000' 14" O. D. L. W. ⅜" wall. Wire or phone collect for prices. VALLEY STEEL PRODUCTS CO., ST. LOUIS, MO.

FOR SALE: 50,000' 9" O. D., 26 pound, lengths 24' to 28'. 110,000' 4.671" O. D., 10.35 pound, lengths 14' to 16' 9". Both above new seamless, plain-end pipe. Wire, write, or phone. LOUISIANA IRON & SUPPLY COMPANY, SHREVEPORT, LA.

FOR SALE: At Seminole, Oklahoma, 1—Used 60 H. P. Western Horizontal Single-Cylinder Gas Engine, Type G-22, 13"x20", 235 RPM. Cities Service Oil, Patridge, Bartlesville, Oklahoma.

FOR SALE: One 16x20 Gaso Vacuum Pump, good as new, drilling machine including some tools. For information write Ed Miller, Caney, Kansas, R. 2.

RELAYING RAILS
12#—exceptionally good quality
36" gauge, 25# portable Tracks
RAILROAD TIE PLATES
for all size rails. All in good condition. For complete details, contact

SONKEN-GALAMBA CORP.
Kansas City 18, Kans.

FOR SALE

Three-light steam rotary rigs, capable of drilling 3,500'; one Fairbanks-Morse powered rotary rig having 8" Johnson drawworks, captable of drilling 5,000'. All located in Oklahoma Panhandle gas field. If interested, inquire:

THE CLAY BROTHERS DRILLING COMPANY, INC.
1804 Fair Building Fort Worth 2, Texas